

THE BOOK
of
KNOWLEDGE

The BOOK *of* KNOWLEDGE

The Children's Encyclopedia

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Stories and Legends	Familiar Things
All Countries	Our Own Life
Golden Deeds	The Fine Arts
Helps to Learning	Men and Women
Literature	Poetry and Rhymes
Animal Life	Plant Life
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VOLUME IV

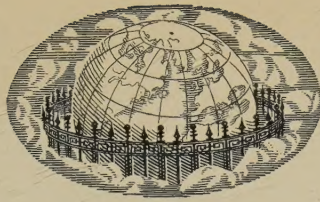
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This is a short guide to the principal contents of this volume. It is not possible to give all of the questions in The Book of Wonder, or the titles of all of the Little Verses and Problems, but in all cases the pages are given where such sections of the book begin. In the big Index, Volume 20, you will find every title and every subject, including the pictures.

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THE HISTORY OF THE UNITED STATES

WE learned in our last story of the United States, how the English and the colonists together drove the French out of North America. Only a few years later these same colonists rose against the English and said that England should no longer rule them. The war known as the Revolution followed, and after seven years the colonists, helped by the French, compelled England to agree that the thirteen colonies were to be independent states in the future. We shall learn in these pages of the reasons for the Revolution, and shall be told how the few colonists were able to contend so long against the mother country, in spite of great difficulties and hardships. Finally, as we shall see, England grew tired of the vain struggle, and the way was open for the birth of a new nation, which has grown into the present United States of America.

THE REVOLUTION

THE English and the colonists fought side by side against France, and succeeded in forcing that nation, in 1763, to give up all its lands in North America either to England or to Spain. Only a few years afterward the colonists were fighting against the English, and the French were helping the colonists. How did these changes come about?



The whole story of these changes is very long and hard to understand because one must know so many other things first; but the principal reason the colonists fought England was on account of taxes, though that is not the only reason. The French helped the colonists because they thought they could in this way punish the English for the loss of their possessions in North America, and yet this is not the only reason either. Nearly always when a nation or a person follows some particular policy or plan, it is for more than one reason. You have heard many times someone say that he did something because of this, and of that and of the other reason.

THE EUROPEAN IDEA OF THE USE OF COLONIES

The trouble which finally led to the Revolution began, in fact, when the different colonies were first

planted. All the countries of Europe thought that the only reason a colony had for existing at all was to help the mother country. No matter how much any rule or law hurt the colony, the old country thought it a good one if it helped it even a little bit. Though the colonists were of the same blood as their relatives who remained in the old country, somehow they were supposed to be inferior to those who had stayed at home, and to have no real rights. We find in the history of colonies in America and elsewhere, many stories which show how the old countries looked down on the new. You remember General Braddock said that the Indians might defeat the "raw militia" but that they could make "no impression on the King's regulars."

HOW A COLONY MIGHT HELP THE MOTHER COUNTRY

Now, there were three ways by which a colony might be of use to the mother country. First, by supplying the precious metals, such as gold and silver; the second, by buying the goods of the old country; and the third, by furnishing those goods which could not be grown or made in the old country.

Only the Spanish colonies in America furnished gold and silver, and they

were really more like armed garrisons than colonies. The English and the French colonists found little or no gold or silver, though they wasted much precious time looking for them. The French colonies in Canada supplied many valuable furs, and some of the people in the English colonies also hunted animals for their fur. The English colonies, however, could grow several articles, such as tobacco, rice, indigo, and pine trees for masts for ships, which England wanted very much. Then, too, they could furnish large quantities of tar and pitch, which were also valuable in building and repairing ships.

TRADE ONCE THOUGHT A GAMBLE IN WHICH ONE SIDE MUST LOSE

Now, we must also think about some strange ideas that people of that time had about trade. They thought that trade was like gambling in which one side must lose. Now we know that there is such a thing as fair trade, in which both parties may gain. To make this clear let us go back to the days when there was no such thing as money and see how people could get the things which they did not or could not easily get by their own labor, and yet wished to have.

Suppose that one man was a good fisherman, and another had learned how to make very quickly the sandals or moccasins which people wore on their feet. Now, if the fisherman wanted to make a pair of sandals, he had to find a piece of skin suitable for the purpose, then had to prepare it and then cut out and sew together the pieces. All of these processes would take a great deal of time. If the sandal-maker attempted to catch fish for himself, he was forced to get ready hooks and lines or nets, make or rent a boat or else sit on the bank and try to get fish. In the time that it would take him to catch fish enough for his family he might be able to make several pairs of sandals.

Would not both men be better off if the fisherman should give some of the fish caught for a pair of sandals? Each would be doing the thing which he could do best, and each would profit by doing that and by not trying to do something which he could not do well. This idea is called the "Division of Labor," and is just as true after money

appears and the fisherman sells the fish he does not need for his family and buys a pair of sandals with money.

THE EUROPEAN COUNTRIES MAKE LAWS TO CRIPPLE THE COLONIES

A hundred and fifty years ago very few men understood the truth that both parties in a trade could gain, and none who did understand it had any part in making laws. So the nations which had colonies made laws which were intended to prevent the mother country from losing in trade with her colonies. The result was often that both parties lost.

England began to make such laws soon after the first colonies were planted in America, and continued to make others. No American colony could send rice, indigo, tobacco and certain other articles to any country except England, and they must be carried in an English or a colonial ship. The colonists were not allowed to buy their goods from any nation except England. So you see that, if France wanted some article produced in the colonies and the colonists wanted some French article in exchange, the French must first sell what they had to English merchants and then buy from them the colonial goods they wished. In this way you can see that the English merchant made two profits and the English or colonial shipowner was paid for carrying the goods to and from America.

But this was not all. As the colonies advanced, some began to manufacture some articles from iron, and to make hats, cloth and a few other things, thus shutting off a part of the British market. So laws were passed forbidding the colonists to manufacture certain goods. They must send their wool to England to be made into cloth, and their iron to be made into pots or plows. When the colonists began to raise more grain than they needed, they were not allowed to send any to England unless a tax on every bushel was paid, for the English farmer thought that he would be injured if American wheat were imported.

THE COLONISTS PAY NO ATTENTION TO THE LAWS

At first these laws made very little difference to the colonists because they were not enforced. The colonists traded wherever they pleased, and

though they were forbidden to send ships to other British colonies, they did so whenever they pleased. There were three reasons for England's neglect. She was busy much of the time with wars in Europe; at first the colonial trade amounted to very little; and then she was afraid that if the colonists were annoyed very much they would make friends with the French, who claimed such a large part of North America. One of the English ministers said that the colonists paid in taxes on goods brought in only \$10,000, and that it cost \$40,000 to collect this sum.

But about 1760 the English government showed a new spirit. George III came to the English throne, and he was determined to be king in fact as well as in name. His grandfather and great-grandfather had both been born in Germany, and never really felt at home in England. Because they could not speak English well they had had little to do with the government, and gradually a few powerful families had come to be the real rulers of the country. George III was determined to change this. He wished to bring all parts of the British Empire under the same regulations.

FRENCH AND INDIAN WAR REALLY THE BEGINNING OF THE REVOLUTION

Another reason was that the French and Indian War, then being fought, was going against the French, and it was believed that the French would soon be driven out. But all through the war the British felt that the colonists did much less than they should have done. Each colony was jealous of every other. There was no central government and each colony did as much or as little as it pleased toward the common defense.

On the other hand, the colonists had fought by the side of regular troops and had done as well, or better, in many battles. They began to have more confidence in themselves and to think of themselves as a part of the British Empire, not as under the British Empire. They acknowledged George III as their king, but began to say that Parliament had no right to make laws for them, but that the legislature of each colony was the little Parliament of that colony.

The British government after the French and Indian War decided to keep

an army in the colonies and to appoint and pay the judges, as it was felt that the judges appointed or elected by the colonists themselves decided too often against the British merchants or officers. It was also decided to make the colonists pay a part of the cost. This seemed fair to the English, as the French and the Indians had been much dreaded by the colonists.

THE STAMP ACT AROUSES THE COLONISTS TO RESISTANCE

Several new laws about taxes were made, but that known as the Stamp Act was most disliked. It was passed by the British Parliament in 1765. According to this act all law papers, such as wills, deeds, appointments to office, licenses to sell liquors of any kind, charters, mortgages, and the like, must be written on stamped paper, each sheet of which cost from six cents to fifty dollars. Every newspaper or pamphlet and every almanac must also be printed on stamped paper of a cheaper kind. Every advertisement and every package of cards also had to pay a stamp tax. It was thought that the tax would amount to about a half-million dollars a year. Such taxes were paid in England without much objection, and very few people there seem to have had any idea that the colonists would object to paying them.

This law did not seem very hard to England. She had not been harsh toward her colonies. All the European nations treated their colonies much more severely than she had done. But England had left the colonies alone too long. They had grown to believe, as we said above, that Parliament had no right to lay any tax on them, as they had no voice in Parliament. There was great excitement in every colony, and the people determined to resist. In several colonies secret societies called "Sons of Liberty" were formed to resist the officers.

Another thing which made the colonists angry was an order that the western lands, which had been won from the French, should not be settled at that time. The colonies thought that these lands belonged to them and were not willing to give them up. Then, too, they felt that prices of everything they bought would be higher because of the new taxes they were to pay.

THE COLONISTS DECIDE TO BUY NO GOODS FROM GREAT BRITAIN

Many people agreed to buy no British goods. In some towns men in charge of the stamps were beaten and ordered to resign. If they refused, their houses were burned and they were threatened with hanging. Many boxes of stamps were burned by the mobs, and some

had forgotten that the colonists were Englishmen, and the English people had settled once for all when they cut off the head of Charles I that they would not be taxed without the consent of their representatives. Some Englishmen said that every member of Parliament represented everybody in the whole British possessions, but the colo-



This quaint picture of the Boston Massacre was made from a very rare old print engraved by Paul Revere, who carried the news of the British march on Lexington and Concord to the farmers along the road. We must confess that Revere, who was a goldsmith in Boston, was more successful as a messenger than as an artist. He became a prominent citizen of Boston, grew rich and had great influence in politics. Some of the houses shown in the picture are still standing in Boston to-day.

of the leading men elected from most of the colonies drew up a paper saying that there ought to be "no taxation without representation." In only two colonies were any stamps used, and not many were used in these.

The English people were astonished at the anger of the Americans. They themselves paid stamp taxes heavier than were charged the colonists. But they

nists said that a man could not represent a country in which he did not live.

THE STAMP ACT REPEALED BUT OTHER TAXES PUT IN ITS PLACE

Parliament repealed the Stamp Act in 1766 but still declared that it had the right to pass any laws it pleased for America. The next year an act was passed placing taxes on all tea, glass, lead, paints and a few other

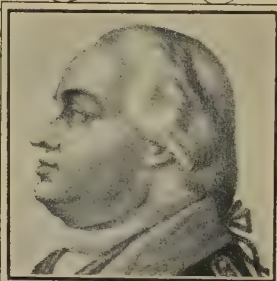
FOREIGN FRIENDS AND FOES



LAFAYETTE



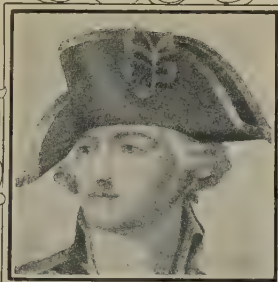
ROCHAMBEAU



STEBEN



KOSCIUSZKO



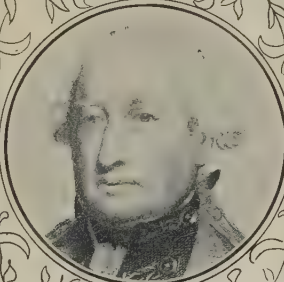
BURGOYNE



HOWE



CLINTON



CORNWALLIS



TARLETON

Lafayette and Rochambeau were brave Frenchmen who fought for us. Baron Steuben, a brave German officer, and Kosciuszko, a gallant Pole, also helped the American cause. General Burgoyne surrendered at Saratoga in 1777, while General Howe and Sir Henry Clinton found conquering America was hard work, and Lord Cornwallis surrendered his entire army. Tarleton was a cruel British cavalry leader.

articles brought into the colonies. The money was to be used to pay the salaries of governors, judges and other officers. The colonists had had some power over their officers before this time, for, if they had felt that the governors were wrong, they had refused to pay their salaries. This act would make all officers servants of the king instead of the people.

The colonists determined to resist. First they agreed to buy none of the taxed articles, and the legislatures began to talk about resisting by force. The governors of some colonies ordered the members of the legislatures to go home. In Boston there were several riots, and in 1768 the king sent some soldiers there. The soldiers and the people were constantly quarreling. In March, 1770, a few soldiers fired upon a mob which was throwing stones and snowballs at them, and killed four and wounded seven. This was called the "Boston Massacre." We show you a picture of it, from a rare old engraving made at the time by Paul Revere, whom we shall hear about soon.

WHAT DOCTOR JOHNSON THOUGHT ABOUT AMERICAN RIGHTS

The merchants of London were all this time losing much money because the colonists refused to buy their goods, and many other men wished Parliament to stop trying to tax America. George III, however, was almost insane on the subject, and said that any man who thought such a thing was an enemy of his country; and he made Lord North, who was the chief minister, do as he said. Doctor Samuel Johnson, the author, about whom you can read on page 1867 of our book, said that the Americans "ought to be thankful for anything we allow them short of hanging."

Parliament, only a few weeks after the "Boston Massacre," took off the tax on all articles except tea, but a tax of six cents a pound was left on that popular drink. The colonies were not satisfied. They objected to paying the tax. In North Carolina some of the inhabitants who said that they were unjustly taxed called themselves Regulators, and drove out some judges. They were defeated on Alamance Creek in 1771 by troops under the royal governor, William Tryon, and about two

hundred were killed or wounded. Many others crossed the mountains into the territory which afterward became Tennessee and Kentucky.

THE BOSTON TEA PARTY SHOWS WHAT MIGHT FOLLOW

Still the colonists refused to buy tea from England and brought in tea from Holland which paid no duty at all. So the English tried a trick. Always before this time the tea sent to America had passed through some British port and had paid there a tax of a shilling. Now the tea intended for sale in America was no longer to pay this tax in England, and in America only the six cent tax was to be paid. In this way the American would get his tea much cheaper than the Englishman could get his. It was thought that the Americans would buy this tea, since they could get it cheaper than any other, and therefore pay the tax. Ships loaded with tea were sent in 1773 to Charleston, Philadelphia, New York and Boston. At Philadelphia and New York the tea-ships were sent back. In Charleston the tea was stored in damp cellars, where it soon spoiled. In Boston a party of men disguised as Indians boarded the ships one night and emptied the tea into the bay. This was the "Boston Tea Party."

The English government now determined to punish these deeds. Even those members of Parliament who had been friendly to the colonists thought that they had gone too far. Several very strict laws were passed, and the port of Boston was closed to ships. An army officer, General Thomas Gage, was put in charge, with the hope that Massachusetts would be starved and the other colonies would be so frightened that they would submit at once.

The result was not what the British expected. The other colonies sent food to Boston by land, and Massachusetts refused to pay any taxes to General Gage's government. The colonies, except Georgia, elected delegates who met in Philadelphia in September, 1774, and called themselves a Continental Congress. This body sent a letter to England telling of their wrongs. Then it published a "Declaration of Rights" in which all the rights of British citizens were claimed, and finally agreed to recommend that the people should buy

no British goods until the colonies were treated better.

THE COLONIES PROPOSE TO RESIST BY FORCE

The different colonies at once began to organize troops and to collect weapons, powder and bullets. General Gage heard that a large quantity was stored in the little village of Concord, near Boston, and on the night of April 18, 1775, troops left Boston to capture or destroy these stores and to arrest

Seven were killed and nine wounded. As they were too few to offer battle, they scattered in every direction. The Revolutionary War had begun.

After the Americans were dispersed, the British marched on seven miles to Concord, only to find that most of the stores had been removed and that other bands of stubborn farmers were on the ground. Here sharp fighting followed, and the British troops were forced to begin a retreat. At Concord Bridge



You read of the Battle of Lexington and Concord on April 19, 1775, in the text. Here you see how the Massachusetts farmers, young and old, rushed to arms, and almost without leaders fired at the British from behind trees and walls until the soldiers were forced to run for their lives. Only the arrival of reinforcements saved all of them from capture. This battle had great influence in making people decide to resist.

two leading patriots, John Hancock and Samuel Adams, who were then at Lexington. But some of the Boston people were watching the soldiers very closely, and Paul Revere, a Boston goldsmith, and others galloped ahead and warned the people. Perhaps you have read Longfellow's poem which tells of Paul Revere's ride, which stirs the blood, though it is not quite accurate.

When the troops reached Lexington, they found a little band of farmers drawn up on the village green. The British commander, Major Pitcairn, ordered them to disperse. They did not move until they were fired upon.

the contest was hardest. Ralph Waldo Emerson has written a poem about the fight which you may find on page 4032. The British did not retreat a moment too soon. The news of the encounter at Lexington had spread like wildfire throughout the country, and the farmers with their trusty rifles came swarming from every direction like angry bees around the troops.

THE RETREAT OF THE BRITISH FROM CONCORD AND LEXINGTON

From behind walls, trees and fences the bands of minutemen fired upon the retreating troops, and then hurried by short-cuts across the fields to fire again.

The retreat became a rout, and the whole force would have been destroyed or captured if reinforcements from Boston had not come out to meet the weary soldiers who had marched all day and who had had nothing to eat for fourteen hours. During the day the British lost nearly 300 men, while the American loss was less than 100 all told.

The news that war had begun spread rapidly when we consider that none of our modern methods of scattering information were in existence. There were no telegraphs or telephones, no railroads or steamboats; but riders with swift horses told the story. From all New England men hurried to Boston. Benedict Arnold and Israel Putnam led volunteers from Connecticut, and John Stark came down from New Hampshire. Putnam is said to have left his oxen hitched to the plow. Soon 16,000 men were besieging Boston. On the 10th of May the forts at Ticonderoga and Crown Point were taken by the Green Mountain Boys under Ethan Allen and Seth Warner, and a large supply of powder and many cannon were taken. Some of these guns were later taken to Boston to be used against the British there.

THE MECKLENBURG DECLARATION OF INDEPENDENCE

When the news reached North Carolina late in May, the inhabitants of Mecklenburg County assembled at Charlotte and took the bold step of declaring themselves independent of Great Britain. The royal governor, before he fled to the protection of a British war vessel at Wilmington, called the resolutions the "most horrid and treasonable publications yet issued in America."

The troops around Boston determined to fortify the high ground overlooking the city, and on the night of June 16 began to throw up earthworks on Breed's Hill. The next day the British attacked and were twice driven back, with the loss of 1,000 men; but the third assault was successful, as the Americans had used all their powder. This was the battle of Bunker Hill, as that was the hill the troops had been expected to fortify.

GEORGE WASHINGTON MADE COMMANDER-IN-CHIEF OF THE ARMY

Meanwhile the delegates from the different colonies, calling themselves the

Second Continental Congress, had met at Philadelphia and voted to raise an army. The Virginian of whom we have heard before was chosen to lead. On the 3rd of July, 1775, George Washington, standing under a great elm at Cambridge, took command of the raw troops and at once began to drill and organize an army.

In spite of these battles the American people as a whole were not yet ready to separate from England. They claimed that they were not fighting against England but against the bad advisers of the king, and Congress sent another petition to him, which he refused to read. Almost immediately he hired about 20,000 troops from the rulers of some small German states. One of these states was Hesse-Cassel, and therefore these troops were generally called Hessians. They were much hated by the Americans, but the men themselves were not to blame. In their own country they were little better than slaves and could not disobey their ruler, who received so much a head for them.

With Washington at Cambridge were many men who became famous in the war which was to follow, among them Benedict Arnold, Daniel Morgan, John Stark, Nathanael Greene, Israel Putnam and Philip Schuyler. Two others, Horatio Gates and Charles Lee, for a time were much valued, but proved failures in the end. All these set to work to make an army, for a mob which has not been drilled or disciplined is not an army though it may accomplish great things while the enthusiasm lasts.

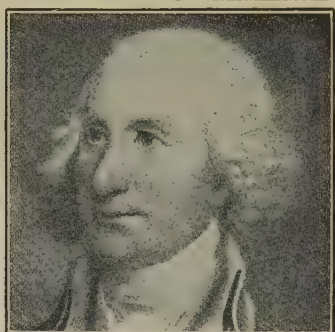
THE UNSUCCESSFUL ATTACK ON CANADA FOLLOWS

Congress decided to try to capture Canada. General Montgomery took Montreal on November 12, 1775, and the next day Benedict Arnold appeared before Quebec. Later he was joined by Montgomery; and on the last night of the year they attacked the town, but Montgomery was killed, Arnold severely wounded, and a part of the army was captured. The Britons soon sent more troops, and the Americans were forced to retreat. But while the American soldiers were meeting with failure here, Washington was able to force the British to give up Boston, where they were obliged to leave many valuable military stores. Washington then moved to New

AMERICAN REVOLUTIONARY GENERALS



PUTNAM



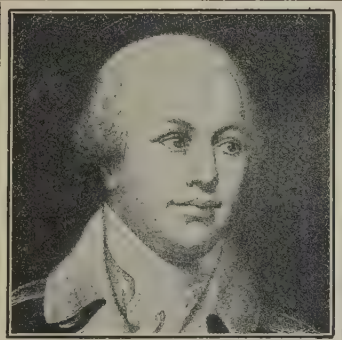
SCHUYLER



MARION



WAYNE



GREENE



MORGAN

Here are six of the leading Revolutionary generals. Israel Putnam was a brave Connecticut farmer, who fought all through the war. Philip Schuyler was about to capture Burgoyne when Gates was unjustly put in his place. Wayne was sometimes called "Mad Anthony," because of his bravery in battle, while Francis Marion was called the "Swamp Fox," as the British could not catch him. Daniel Morgan was a good officer, and, next to Washington, Nathanael Greene was the best American general.

York, which he knew would be soon attacked.

WHAT THE WORDS WHIG AND TORY MEANT DURING THE REVOLUTION

The feeling that the colonies must be independent was growing fast, but in almost every colony there was a strong party which wished to remain under English rule. These people were called Tories, while the independence party took the name Whig. In North Carolina 1,600 Scotchmen, recently arrived in the colony, marched toward Wilmington to join Sir Henry Clinton. They were met at Moore's Creek, February 27, 1776, by about 1,000 Whigs, and put to rout. Among the prisoners was Allan Macdonald, the husband of the famous Flora Macdonald who had helped the Young Pretender to escape. Sir Henry Clinton was so much discouraged by the battle that he did not try to take Wilmington, but sailed on to Charleston. There a rude fort had been built of palmetto logs, and the guns of the fleet did little harm, while the ships were badly shattered.

A PAPER WHICH HAS CHANGED THE HISTORY OF THE WORLD

Soon after Moore's Creek, North Carolina voted for complete independence, and other states soon followed. The royal governors had been driven out and elected ones put in their places. On the 7th of June, 1776, Richard Henry Lee of Virginia moved in Congress "that these United Colonies are, and of a right ought to be, free and independent states." The question was discussed for several weeks, for many good men had not yet given up hope that England and the colonies might somehow agree. Finally, on July 2, twelve colonies voted for independence and began to discuss the words in which they were to publish what they were going to do. On July 4, 1776,—a date all Americans must remember—the Declaration of Independence, written by Thomas Jefferson, was agreed upon. We shall not stop here to say much about this paper which declared that the colonists would no longer be subject to England, though it is a very important document.

You are sometimes told that the Declaration of Independence was signed upon July 4, 1776. This is not quite

true. It was agreed upon on that date, but it was not signed until much later, after a copy had been made upon parchment. Some men who had voted for it were not present when the copy was finished and did not sign until months afterward. One man who helped to draw up the paper never signed it.

Everywhere the news was received with joy. Bells were rung, bonfires were lighted and people marched in torchlight processions. In New York a leaden statue of George III stood in the little park called Bowling Green. This the people pulled down and sent to Connecticut to be made into bullets. In other places everything which reminded the people of English rule was torn down.

THE BRITISH PLAN TO DIVIDE THE COLONIES

The war was now begun in earnest. We cannot describe all the battles, but shall tell of the most important. The first plan of the British was to gain control of the Hudson River. In this way New England would be cut off from the other colonies, and it was thought that success would be easier. One army was to move down from Canada, while another under Lord Howe was to capture New York City, then held by Washington. The Canadian army was driven back by Benedict Arnold, but the other was more successful.

General William Howe and his brother, Lord Howe, who commanded the British fleet, had many more men than Washington, and hoped to capture the soldiers stationed on Long Island. The American troops were badly defeated in the battle, but the night of August 29, 1776, was dark and foggy. Washington crossed over the East River and escaped without losing a man. He then marched to the northern part of Manhattan Island and camped about where the College of the City of New York stands. Howe followed, but was defeated in a battle on Harlem Heights near where Columbia University now stands. In order to escape being surrounded, Washington was forced to retreat from Manhattan Island. At White Plains Howe gained some advantage on October 29, and on November 16 captured Fort Mifflin on the Hudson River and took 3,000 prisoners.

THE DECLARATION OF INDEPENDENCE BEFORE CONGRESS



John Trumbull, a Revolutionary soldier, who had been Washington's secretary, after the war went to London to study painting. On his return he painted the portraits of many men prominent in the struggle. The original of this picture is in the Capitol at Washington. The man in the chair is John Hancock, President of Congress. The five men are the Committee to draw up the Declaration: Benjamin Franklin, Thomas Jefferson, Robert Livingston, Roger Sherman and John Adams.

**WASHINGTON IS FORCED TO RETREAT
ACROSS NEW JERSEY**

Washington feared that Howe intended to march on to Philadelphia, and crossed over into New Jersey. Nearly half of his army was still on the New York side, under General Charles Lee, who was ordered to cross into New Jersey also. That officer, who was jealous of Washington and thought that he himself ought to be commander-in-chief, failed to obey promptly, and Washington was forced to retreat across New Jersey into Pennsylvania. When Lee did cross, he was captured through his own carelessness, but his little army joined Washington. On Christmas night Washington, with 2,500 men, recrossed the Delaware River, then filled with floating ice, and captured 1,000 prisoners at Trenton.

The British had begun to think that the war was over. It is said that some of the officers had sent their baggage on board ship at New York, expecting soon to return to England. But when the news of this sudden stroke came, the British officers hurried back to New Jersey, only to have a part of their forces surprised and defeated at Princeton, a little more than a week after the defeat of Trenton. Washington was not able to risk a battle with the whole British army and soon withdrew into the hills around Morristown, where the British were afraid to attack him.

**A
AMERICAN SUCCESS LEADS TO HELP
FROM FRANCE**

The result of the first year of the war was, on the whole, favorable to the Americans. Though New York had been lost, and Fort Washington captured, and though the American army had been defeated at Long Island and at White Plains, it had been proved that the American soldiers were a match for an equal number of British. Washington had shown military ability which surprised Europe, and the British began to be afraid of him. Some wished to give up the war. France became interested and began to loan money, and some French officers came over to fight in the American army. Among these was the Marquis de Lafayette, whom Washington afterward came to love like a son. He was only a boy when he arrived, but soon became a good soldier.

**T
THE BRITISH AGAIN PLAN TO CUT THE
COLONIES IN TWO**

The British still intended to cut the colonies in two by capturing the Hudson River. So the plan for 1777 was for an army under General John Burgoyne to march down from Canada along Lake Champlain toward Albany. Another was to start from Lake Ontario, move down through the Mohawk Valley, stir up the Tories and the Six Nations, and finally join Burgoyne. The third army, under Howe, was to march up the Hudson from New York to Albany. General Philip Schuyler, the American commander, had a very small force at first, and could not fight Burgoyne, but as he retreated, he cut down trees, broke down bridges, and made the roads so bad that Burgoyne spent twenty days in moving twenty miles. Some Indians joined the British, but few Tories came, and the Indians did more harm than good, for their cruelty stirred up the Americans to join Schuyler. Burgoyne sent a party of Hessians to capture some military supplies the Americans had collected at Bennington, Vermont, but General John Stark defeated the British force and took 600 prisoners. The other British army, which had been expected to come from Lake Ontario to arouse the Tories and Indians and then join Burgoyne, was defeated at the battle of Oriskany, near Fort Stanwix, by General Nicholas Herkimer. The Indians deserted the British.

Just when Schuyler's army had grown large enough to attack Burgoyne, his enemies in Congress succeeded in having General Horatio Gates put in his place. On the 19th of September and on the 7th of October, 1777, two bloody battles were fought near Saratoga and were won by the Americans, largely through the efforts of Schuyler, Arnold and Morgan, though, of course, Gates got the credit. Burgoyne surrendered his whole army on the 17th of October, as Howe had sent no help.

**T
THE BATTLES OF BRANDYWINE AND
GERMANTOWN**

Howe had made the mistake of trying to take Philadelphia before going to the aid of Burgoyne. Washington opposed him at Brandywine Creek, September 11, and, though defeated, delayed the British for some time; and three weeks later only a fog prevented

HARDSHIPS OF THE REVOLUTION



On Christmas night, 1776, Washington crossed the Delaware River, with 2,500 men, and surprised a force of Hessian troops at Trenton, New Jersey, capturing 1,000 of them. The weather was so cold that the Hessians thought no army could move. Our picture was made from the painting by Leutze, now in the Metropolitan Museum, New York City. It is a spirited picture, even if the boat is overloaded.



Valley Forge is a village near Philadelphia. Here Washington's army spent the winter of 1777-78, suffering much from cold, hunger and lack of proper clothing. Here we see Washington engaged in studying a map, while some of the half-starved and poorly clothed soldiers are warming themselves around a little fire. Because of bad management food and clothing were not delivered.

an American victory at Germantown. Soon it was too late to aid Burgoyne. Though unsuccessful in two battles and though Philadelphia had been lost, Washington had gained more than he had lost, for he had enabled the northern army to capture Burgoyne.

UNNECESSARY SUFFERING AT VALLEY FORGE

During the winter of 1777-78 the British enjoyed themselves in Philadelphia, but for Washington's army in the little village of Valley Forge it was a time of horror. There was not enough food, and clothing was scarce. Sometimes the men left bloody tracks upon the snow, and it was difficult to keep them from going home. The worst thing about this suffering was that it was unnecessary, if the American Congress had known how to manage better. There was food enough and clothing enough in the country if it had only been sent to the right places at the right times. During this dreadful winter some members of Congress and some army officers tried to put Gates in Washington's place, but failed, as they deserved.

FRANCE AGREES TO HELP THE AMERICANS IN THE WAR

But in all this discouraging time, one bright thing happened. France had been loaning money to help carry on the war. Now she recognized the independence of the colonies, made a treaty with them, and agreed to send a fleet to help. The surrender of Burgoyne had been so discouraging to England that in February, 1778, the British government gave up every single point in the dispute, and agreed not to try to levy any taxes on the colonies if they would disband their armies. If this had been done three years before, there would have been no war, but it was now too late.

During all this time the colonies had had no real navy, though a few small vessels under John Paul Jones, John Barry and others were fitted out. Privateers were also sent out to attack the British merchant ships and had captured many of them. A privateer was a ship owned by a citizen which was given permission to attack and capture ships belonging to the enemy. These privateers were so successful that the British began to send a warship with every merchant fleet to protect it. Later, by the help

of France, a few war vessels were gotten together, and under John Paul Jones did considerable damage to the British, who called him a pirate. They even demanded that other nations should give him up if he sailed into any of their harbors. The fact that Holland refused, had much to do with bringing about a war with that country.

WAR NOW IS CARRIED ON IN THE SOUTH

England was soon at war with France, Spain and Holland, and so could not send over enough troops to crush the Americans. In 1778-79 no very important battles were fought, but General Anthony Wayne took Stony Point on the Hudson. The British tried harder to persuade Tories to enlist in the army. The plan of the war was also changed. Instead of trying to cut the colonies in two, troops were sent to the South to conquer those colonies one at a time, but the Tories and Indians were stirred up in all the colonies. Georgia was soon taken, as the colony was very weak, and soon South Carolina was also under British authority.

For a time there was no army in the state, but not all were willing to give up. Small bands of patriots, under Francis Marion, Thomas Sumter, Andrew Pickens and others, hid in the swamps, from which they dashed out to attack the Tories or even small bands of British troops, and then retreated to their hiding-places before they could be captured. They could not do much, but they kept the British uneasy. Marion was often called the "Swamp Fox," and Sumter the "Game Cock," one because he was so silent and so swift in his movements and the other because in battle he fought to the death.

THE STORY OF MARION AND THE BRITISH OFFICER

Perhaps you have heard the story of the British officer who visited Marion under a flag of truce. A flag of truce is an arrangement by which one is given permission to approach an enemy on business without being fired upon, or being taken prisoner. The officer was met at a certain place by some of Marion's men, who blindfolded him and led him through the swamps. Finally the bandage was removed from his eyes, and he found himself in a little open space in the forest. His business was

HARD FIGHTING IN THE SOUTH



Major Patrick Ferguson was one of Cornwallis' best cavalry officers, and was sent to enlist the Tories in the British army, and to subdue the western part of North and South Carolina. At King's Mountain, near the line between the two states, he was surrounded, October 3, 1780, by the backwoodsmen from Virginia and the Carolinas. Some came over the mountains from what is now Tennessee. Ferguson and 400 of his men were killed and the remainder were taken prisoners. This blow forced Cornwallis to retreat.



The next year Colonel Banastre Tarleton, the British cavalry officer, attacked General Morgan at the Cowpens and was badly defeated. During the battle Colonel William Washington, who was not a relative of General Washington, met Tarleton in personal combat and wounded him in the hand. This was one of the most brilliant victories of the war and did much to cheer the drooping American spirits. From old prints.

soon finished, and Marion asked him to remain to dinner. The officer saw no cook and no evidence of cooking, though a fire was burning on the ground, but he accepted. Then Marion told his servant to serve dinner. The servant raked aside the ashes of the fire and drew forth some sweet potatoes which had been roasting there. These he served on pieces of bark. There was no other food. It is further said that the officer reported to his superiors that such men could not be conquered.

GATES IS DEFEATED AND FLIES FROM THE FIELD

When an army was raised to try to recapture South Carolina and Georgia, it was put under the command of Gates, whom many still thought to be a great general, because the troops under his command had captured Burgoyne. While marching to make a night attack on Cornwallis in August, 1780, he was met at Camden by that officer, who was also marching to surprise him. The American army was cut to pieces, and it is said that Gates rode his horse seventy-five miles without stopping in his wild flight. Many people grew discouraged, and the British felt that the whole South would soon be in their power.

ARNOLD'S TREASON SHOCKS THE COUNTRY

Just about this time the treason of Benedict Arnold, about which you may learn much on page 3996, shocked the country, but a victory occurred soon after and aroused more hope. Colonel Patrick Ferguson, one of Cornwallis's officers, with about 1,100 British and Tories, was defeated and killed at King's Mountain by a band of backwoodsmen from Virginia and the Carolinas who fought without a leader and killed or captured all of the British force. A new army was raised and put under Nathanael Greene. Meanwhile Morgan defeated Tarleton, the British cavalry leader, at the Cowpens in South Carolina, and then retreated into North Carolina to escape Cornwallis. Morgan was joined by Greene, and Cornwallis followed but could not overtake them. Finally Greene turned, and a battle was fought at Guilford Court House, near the present city of Greensboro, North Carolina. Though the Americans were

defeated, Cornwallis lost many men and decided to march to the seacoast. After reaching Wilmington, he then determined to go to Virginia to join other British commanders there. Greene marched back to South Carolina and soon drove the British into Charleston.

In Virginia, Cornwallis tried to capture Lafayette, who had a small force, saying, "The boy cannot escape me"; but the boy did, and his force grew larger as the Virginians joined him. At one time Cornwallis almost captured Thomas Jefferson, then the governor of the state. Cornwallis determined to retreat toward the sea, and sent to Sir Henry Clinton in New York asking reinforcements. Early in August he reached Yorktown, on the York River, and waited for an answer. Clinton, however, believed that New York was much more important than Virginia, and would not send any more men.

WASHINGTON TRANSFERS HIS ARMY TO THE SOUTH

Washington was then on the Hudson River near West Point. The year before, 6,000 French troops under Count Rochambeau had been sent over, and just now Washington learned that a strong French fleet under Count de Grasse was on the way. He determined upon the bold idea of leaving New York and marching to Yorktown. On August 19, 1781, the march was begun, and Philadelphia was reached before Sir Henry Clinton knew what he was doing. The French fleet prevented General Clinton from sending any aid by water, and soon the American and the French armies, about 16,000 in all, were at Yorktown. The siege was begun, no help came to the British general, and on October 19, 1781, Cornwallis surrendered 7,247 men and 840 sailors, more than 8,000 men in all.

The American army was drawn up in one line, the French in another. Between them marched the captured army with bands playing a tune called *The World Turned Upside Down*. How proud Washington must have felt as he looked over his veterans and remembered the dangers, hardships and discouragements through which he had passed. Cornwallis, sick with mortified pride and bitter regret, remained in his tent and sent his sword by another.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 1299.

THE CLOSING DAYS OF THE REVOLUTION



The painting from which this picture was made represents a scene before Yorktown just as Cornwallis was about to surrender in October, 1781. Washington and Rochambeau, the French general, have pressed hard upon the British, who have waited in vain for assistance. Here we see the giving of the final orders which resulted in the surrender of Lord Cornwallis. This practically ended the war.



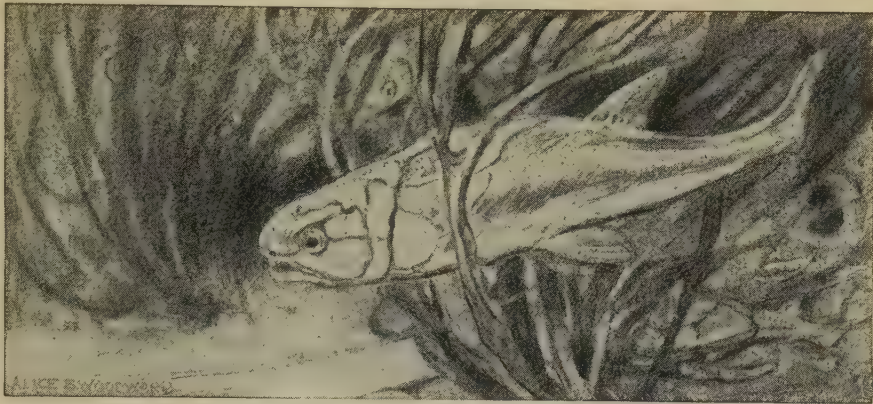
After the surrender of Cornwallis, Washington marched his army northward to the neighborhood of New York. The formal treaty of peace was not made until 1783, after which the army was disbanded. On December 4, 1783, Washington bade an affectionate farewell to the generals who had served with him, in the Long Room of Fraunce's Tavern, which is still standing in the lower part of the city of New York. After this ceremony the whole party proceeded on foot to the end of Manhattan Island, where Washington embarked for New Jersey on the way to his beloved Mount Vernon.

A REMINDER OF THE REVOLUTION



Photo, N. L. Stebbins.

Among the memorials of the Revolutionary War is this fine statue by Daniel Chester French, which stands in Concord, Massachusetts, at one end of the bridge where, on April 19, 1775, the Minute Men, leaving their plows and seizing their guns as soon as the alarm was given, resisted the British. The sculptor has shown one of them in the very act. In the poetry section you will find Emerson's Concord Hymn, celebrating the battle, the first stanza of which is quoted on the base of the statue.



A fish of the Devonian Period.

THE WORLD IN THE DEVONIAN PERIOD

WE now come to that long period of the earth's history when fishes were the highest and dominant form of life then in existence.

This geological period is known as the Devonian, because it was in Devonshire, England, that its chief rock, the Old Red Sandstone, was found in exceptional abundance and was first seen to represent a great era in the development of life. It is, however, found over vast tracts of North America, Africa, Northern Europe and elsewhere.

In studying the Silurian Period we saw how the successors of the trilobites, in order to save themselves from the increasing numbers and size of their enemies, had by constant effort and exercise acquired rapidity and flexibility of movement. So in this period we find little fossil fishes. Small and strange-looking little creatures they were in Silurian times, but a great change took place during the many, many years when the Silurian Period was gradually changing into the Devonian.

Vast numbers of lobster-like creatures called Eurypterids, of which the Pterygotus was one of the most formidable, had developed enormously and infested the seas and great lakes. But by their activity the little fishes ulti-

CONTINUED FROM 1033



mately outstripped and escaped these enemies; and the fact that their

bodies were not incased in a hard shell, but grew round a central backbone, enabled them to develop into giant creatures over thirty feet long.

Their bodies—more particularly their heads and more vital parts—were protected by bony plates, some small and some large, like coats of mail, which grew with the fish and suited each type's mode of life. Some lived their lives one way and some another, but their instincts ever impelled them to adapt themselves more and more to their surroundings, and so they ever improved and became more wonderful. For the Great Giver of this abundant life gave, too, this wonderful power.

In the course of this long Devonian Period, which lasted through many years, the fishes multiplied greatly, and by their efforts to adapt themselves they acquired new characters, such as fins, better suited to their movements than the paddles of the Pterichthys. They developed, also, powerful teeth which were far more useful for all purposes than the great claws of the pterygotus or the long arms of the octopus, and which, later on, set in powerful jaws, were to become the most powerful

weapons in the animal kingdom. Great sharks with frilled gills and rows of terrible teeth also developed, feeding on the dead and surplus creatures of those densely populated waters. These Acanthodians, as they are called, some of them quite small, have descendants to this day carrying on their work as scavengers of the open sea.

THE QUEER AND TERRIBLE REPTILES ON THE EARTH IN THOSE DAYS

Another monster of those days was the berry-boned fish, or Coccosteus, varying in length from one to twenty-five feet. Others, known as the terrible fish and the titan fish, developed into a much higher type than the sharks, and developed lungs, so that they could breathe air and leave the water, or live in the sand when stranded by the tides. The cocosteus has gone, and only its form remains printed in these Old Red Sandstone rocks. The Dipterus—shown in our picture with its head out of water making for dry land—had lungs as well as gills.

There are fishes with lungs now existing in Australia, South America and Africa which are the direct descendants of the dipterus, and have changed but little from their far-distant ancestors.

Also in the Devonian rocks of Pennsylvania have even been found tracks of Amphibians, the lowest forms of air-breathing, backboned animals.

THE GIANT TREES THAT GREW IN THE LONG AGO

The vegetation in the beginning chiefly consisted of mosses, almost the first of land plants, but in Devonian times they became great trees somewhat like the monkey-puzzle tree in appearance. These great moss trees are called Lepidodendrons. Ferns also flourished, growing tall like palms and forming forests; and the sort of reed called calamite grew in profusion. These forms of vegetation are shown in the upper picture on page 1177.

There have been found traces of pine trees, but, so far as is known, there were no flowers. The kind of plant life that existed then indicates a very moist atmosphere, much cloud, heavy torrential rain and very little direct sunshine.

That is what we should expect in this early age of our earth, and other facts point the same way. The lower picture on page 1177 gives us some idea of how the creatures of those far-off days are now found as fossils, although they are shown

unduly crowded in our small space and, of course, on a much enlarged scale in proportion to the thickness of the rock strata. In the United States, Devonian rocks occupy New York from the Erie Canal to the south central boundary and reach far southward in narrow bands, and westward from Lake Erie to Chicago, with a small patch in northeastern Iowa. Patches occur in Colorado, in Arizona deep down in the Grand Canyon, and in Nevada. In all, we can find 8,000 to 10,000 feet of limestones, coral reefs and shales belonging to the rocks of this age in the United States. Sometimes these rocks are black shales, as under the Mississippi Valley; sometimes great coral reefs are found, as in the limestones causing the falls of the Ohio above Louisville, Kentucky; sometimes the rocks are shallow-water sandstones, as in Pennsylvania. The great stores of gas and oil of Pennsylvania were held in the Devonian sandstones there. Among all these different rocks, however, is found little or no red sandstone, which often makes it hard for us to understand why the English geologist Hugh Miller called the series the Old Red Sandstone.

In eastern Canada there are Devonian rocks around Montreal, in Gaspé peninsula and in New Brunswick and Nova Scotia. Along the course of the Mackenzie River and in the Canadian Rockies are areas where considerable thickness of these strata is found.

Volcanoes were many during the latter part of the period. Mount Royal, behind Montreal, is one of these, and there are many others. One of the most important students of the period was Sir William Dawson, long principal of McGill University.

THE GREAT LAKE THAT REACHED FROM SCOTLAND TO NORWAY

The great Devonian sea covered the whole of Europe south of Belgium and Denmark, while most of Northern Europe, and even possibly the North Atlantic, was land. But this land contained some great fresh-water lakes, probably three, comparable with the great Canadian lakes. It is believed that one of them extended from the north of Scotland to Norway across what is now the North Sea, that another extended across central Scotland and northern Ireland, the third covered south Wales and Herefordshire.

THE NEXT STORY OF THE EARTH IS ON PAGE 1295.

IMAGINARY VIEW OF THE DEVONIAN PERIOD



Here is shown the surface of the earth as it probably appeared in the Devonian Period, when fishes were the highest form of life. In the water are some of the fishes and crustaceans which then abounded.



A section through the rock of the Devonian Period containing fossil remains. The fossils are chiefly fishes, mingled with Trilobites and other crustaceans. The big fish in the centre is a Coccosteus, and above is what looks like a Diptherus.

THE COMPANY AT THE MAD TEA-PARTY



ALICE WITH THE MARCH HARE, THE MAD HATTER, AND THE SLEEPING DORMOUSE
 There was a table set out under a tree, where the March Hare and the Hatter were having tea; a dormouse was sitting between them fast asleep, and the other two were using it as a cushion, resting their elbows on it, and talking over its head. "No room! No room!" they cried out when they saw Alice coming. "There's plenty of room!" said Alice indignantly. And she sat down in a large armchair at one end of the table.

ALICE'S ADVENTURES IN WONDERLAND

HERE we follow Alice further in her many and strange adventures in Wonderland. It will be remembered that she had just escaped from the house of the White Rabbit, after having eaten the little cakes which made her so tiny that she could get through the very little door of the house. She then ran into a thick wood where she would be safe until she could decide what she would next attempt to do, for she was only three inches high now, and wished to grow a bit! What happened after this is told in the following pages.

THE MAD TEA-PARTY

ONCE in the wood, she was anxious to get back to her right size again, and then to get into that lovely garden. But how? Just then she saw an enormous puppy looking down at her from among the trees. She held up a stick for it to catch, and the next moment it was playing with great delight; but as Alice was so small and the puppy so large, she was in danger of getting hurt by it, so she escaped when it was out of breath. If she could only get something to eat or drink, she was sure something would happen to her. Peeping over a mushroom, she beheld a large blue caterpillar sitting on the top with its arms folded, quietly smoking a long hookah, and taking not the smallest notice of her or of anything else. At length, in a sleepy sort of way, it began talking to her, and she told it what she wanted so much—to grow to her right size again.

"I should like to be a *little* longer," she said. "Three inches is such a wretched height to be."

"It is a very good height indeed," said the Caterpillar angrily, rearing itself upright as it spoke (it was exactly three inches high).

"But I'm not used to it," pleaded poor Alice in a piteous tone. And she thought to herself: "I wish the creatures wouldn't be so easily offended."

"You'll get used to it in time," said the Caterpillar; and it put the hookah into its mouth and began smoking again.

This time Alice waited patiently until it chose to speak again. In a minute or two the Caterpillar took the hookah out of its mouth and yawned

CONTINUED FROM 1102



once or twice, and shook itself. Then it got down off the mushroom, and crawled away into the grass, merely remarking as it went: "One side will make you grow taller, and the other side will make you grow shorter."

"One side of *what*? The other side of *what*?" thought Alice to herself.

"Of the mushroom," said the Caterpillar, just as if she had asked it aloud; and in another moment it was out of sight.

Alice remained looking thoughtfully at the mushroom for a minute, trying to make out which were the two sides of it; and as it was perfectly round, she found this a very difficult question. However, at last she stretched her arms round it as far as they would go, and broke off a bit of the edge with each hand.

"And now which is which?" she said to herself, and nibbled a little of the right-hand bit to try the effect. The next moment she felt a violent blow underneath her chin; it had struck her foot!

She was a good deal frightened by this very sudden change, but she felt that there was no time to be lost, as she was shrinking rapidly; so she set to work at once to eat some of the other bit. Her chin was pressed so closely against her foot that there was hardly room to open her mouth; but she did it at last, and managed to swallow a morsel of the left-hand bit.

The next minute she had grown so tall that her neck rose like a stalk out of a sea of green leaves, and these green leaves were the trees of the wood. A pigeon attacked her, calling her a

serpent, and no wonder, with such a neck. But by nibbling bits of mushroom she at last succeeded in bringing herself down to her usual height. But, oh dear, in order to get into the first house she saw, she had to eat some more of the mushroom from her right hand and bring herself down to nine inches. Outside the house she saw the Fish-footmen and the Frog-footmen with invitations from the Queen to the Duchess, asking her to play croquet. The Duchess lived in the house, and a terrible noise was going on inside, and when the door was opened a plate came crashing out. But Alice got in at last, and found a strange state of things. The Duchess and her cook were quarreling because there was too much pepper in the soup. The cook threw everything she could lay hands on at the Duchess,

and nearly knocked the baby's nose off with a saucepan.

The Duchess had the baby in her lap, and tossed it about ridiculously, finally throwing it in the most heartless way to Alice, and telling her she could nurse it if she liked. She took it out of doors, and, behold, it turned into a little pig, jumped out of her arms and ran away into the wood.

"If it had grown up," she said, "it would have made a dreadfully ugly child; but it makes rather a handsome pig, I think."

She was a little startled now by seeing the Cheshire Cat—which she had first seen in the house of the Duchess—sitting on a bough of a tree a few yards off. The Cat only grinned when it saw Alice. It looked good-natured, she thought; still,

THE LAZY BLUE CATERPILLAR TELLING ALICE ABOUT THE MUSHROOM



In a minute or two the Caterpillar took the hookah out of its mouth, yawned once or twice, and shook itself. As it got down off the mushroom, it remarked: "One side will make you grow taller, and the other side will make you grow shorter." "One side of what?" "The other side of what?" thought Alice. "Of the mushroom," said the Caterpillar, as if she had asked it. But how was she to tell one side from the other?

it had *very* long claws and a great many teeth, so she felt that it ought to be treated with respect.

"Cheshire Puss," she began rather timidly, as she did not at all know whether it would like the name; however, it only grinned a little wider. "Come, it's pleased so far," thought Alice, and she went on: "Would you tell me, please, which way I ought to walk from here?"

"That depends a good deal on where you want to get to," said the Cat.

"I don't much care where—" said Alice.

"Then it doesn't matter which way you walk," said the Cat.

"So long as I get *somewhere*," Alice added as an explanation.

"Oh, you're sure to do that," said the Cat, "if you only walk long enough!"

Alice felt that this could not be denied, so she tried another question.

"What sort of people live about here?"

"In *that* direction," the Cat said, waving its right paw round, "lives a hatter; and in *that* direction"—waving the other paw—"lives a March hare. Visit either you like; they're both mad."

"But I don't want to go among mad people," Alice remarked.

"Oh, you can't help that," said the Cat; "we're all mad here! I'm mad. You're mad."

"How do you know I'm mad?" said Alice.

"You must be," said the Cat, "or you wouldn't have come here."

Alice didn't think that proved it at all; however, she went on: "And how do you know that you're mad?"

"To begin with," said the Cat, "a dog's not mad. You grant that?"

"I suppose so," said Alice.

"Well, then," the Cat went on, "you see, a dog growls when it's angry, and wags its tail when it's pleased. Now, *I* growl when I'm pleased, and wag my tail when I'm angry. Therefore I'm mad."

"I call it purring, not growling," said Alice.

"Call it what you like," said the Cat. "Do you play croquet with the Queen to-day?"

"I should like it very much," said Alice, "but I haven't invited yet."

"You'll see me there," said the Cat, and vanished. . . . Alice waited a little,



"Cheshire Puss," Alice began rather timidly, "would you tell me, please, which way I ought to walk from here?" "That depends on where you want to get to," said the Cat, which was grinning strangely.

half expecting to see it again, but it did not appear, and after a minute or two she walked on in the direction in which the March Hare was said to live.

"I've seen hatters before," she said to herself; "the March Hare will be much the more interesting, and perhaps as this is May it won't be raving mad—at least, not so mad as it was in March." As she said this, she looked up, and there was the Cat again, sitting on a branch of a tree.

"Did you say pig, or fig?" said the Cat.

"I said pig," replied Alice; "and I wish you wouldn't keep appearing and vanishing so suddenly; you make one quite giddy."

"All right," said the Cat; and this time it vanished quite slowly, beginning

with the end of the tail, and ending with the grin, which remained some time after the rest of it had gone.

"Well, I've often seen a cat without a grin," thought Alice; "but a grin without a cat! It's the most curious thing I ever saw in all my life."

She had not gone much farther before she came in sight of the house of the March Hare; she thought it must be the right house, because the chimneys were shaped like ears and the roof was thatched with fur. It was so large a house that she did not like to go nearer till she had nibbled some more of the left-hand bit of mushroom, and raised herself to about two feet high; even then she walked up towards it rather timidly, saying to herself: "Suppose it should be raving mad after all. I almost wish I'd gone to see the Hatter instead."

There was a table set out under a tree in front of the house, and the March Hare and the Hatter were having tea at it; a dormouse was sitting between them fast asleep, and the other two were using it as a cushion, resting their elbows on it, and talking over its head.

"Very uncomfortable for the Dormouse," thought Alice; "only, as it's asleep, I suppose it doesn't mind."

The table was a large one, but the three were all crowded together at one corner of it.

"No room! No room!" they cried out when they saw Alice coming.

"There's *plenty* of room!" said Alice indignantly. And she sat down in a large armchair at one end of the table.

"Have some wine," the March Hare said, in an encouraging tone.

Alice looked all round the table, but there was nothing on it but tea.

"I don't see any wine," she remarked.

"There isn't any," said the March Hare.

"Then it wasn't very civil of you to offer it," said Alice angrily.

"It wasn't very civil of you to sit down without being invited," said the March Hare.

"I didn't know it was *your* table," said Alice; "it's laid for a great many more than three."

"Your hair wants cutting," said the Hatter.

He had been looking at Alice for some time with great curiosity, and this was his first speech.

"You should learn not to make personal remarks," Alice said, with some severity; "it's very rude."

The Hatter opened his eyes very wide on hearing this, but all he *said* was:

"Why is a raven like a writing-desk?"

"Come, we shall have some fun now," thought Alice. "I'm glad they've begun asking riddles. I believe I can guess that," she added aloud.

"Do you mean that you think you can find out the answer to it?" said the March Hare.

"Exactly so," said Alice.

"Then you should say what you mean," the March Hare went on.

"I do," Alice hastily replied; "at least—at least, I mean what I say. That's the same thing, you know."

"Not the same thing a bit," said the Hatter. "Why, you might just as well say that 'I see what I eat' is the same thing as 'I eat what I see.'"

"You might just as well say," added the March Hare, "that 'I like what I get' is the same thing as 'I get what I like.'"

"You might just as well say," added the Dormouse, who seemed to be talking in his sleep, "that 'I breathe when I sleep' is the same thing as 'I sleep when I breathe.'"

"It *is* the same thing with you," said the Hatter; and here the conversation dropped, and the party sat silent for a minute, while Alice thought over all she could remember about ravens and writing-desks, which wasn't much.

The Hatter was the first to break the silence.

"What day of the month is it?" he said, turning to Alice.

He had taken his watch out of his pocket and was looking at it uneasily, shaking it every now and then, and holding it to his ear.

Alice considered a little, and said:

"The fourth."

"Two days wrong," sighed the Hatter. "I told you butter wouldn't suit the works," he added, looking angrily at the March Hare.

"It was the *best* butter," the March Hare meekly replied.

"Yes, but some crumbs must have got in as well," the Hatter grumbled. "You shouldn't have put it in with the bread-knife."

The March Hare took the watch and looked at it gloomily; then he dipped it

into his cup of tea, and looked at it again, but he could think of nothing better to say than his first remark: "It was the *best* butter, you know."

Alice had been looking over his shoulder with some curiosity.

"What a funny watch!" she remarked. "It tells the day of the month, and doesn't tell what o'clock it is."

"Why should it?" muttered the Hatter. "Does your watch tell you what year it is?"

"Of course not," Alice replied very readily; "but that's because it stays the same year for such a long time together."

"Which is just the case with *mine*," said the Hatter.

Alice felt dreadfully puzzled. The Hatter's remark seemed to her to have no sort of meaning in it, and yet it was certainly English.

"I don't quite understand you," she said, as politely as she could.

"The Dormouse is asleep again," said the Hatter; and he poured a little hot tea on to its nose.

The Dormouse shook its head impatiently, and said, without opening its eyes;

"Of course, of course. Just what I was going to remark myself."

"Have you guessed the riddle yet?" the Hatter said.

"No; I give it up," Alice replied. "What's the answer?"

"I haven't the slightest idea," said the Hatter.

"Nor I," said the March Hare. Alice sighed wearily.

"I think you might do something better with the time," she said, "than wasting it in asking riddles that have no answers."

"If you knew Time as well as I do," said the Hatter, "you wouldn't talk about wasting it. It's *him*."

"I don't know what you mean," said Alice.

"Of course you don't," the Hatter said, tossing his head contemptuously. "I dare say you never even spoke to Time."

"Perhaps not," Alice cautiously replied; "but I know I have to beat time when I learn music."

"Ah, that accounts for it!" said the Hatter. "He won't stand beating. Now, if you only kept on good terms with him, he'd do almost anything you liked with the clock. For instance, suppose it were

nine o'clock in the morning, just time to begin lessons: you'd only have to whisper a hint to Time, and round goes the clock in a twinkling. Half-past one, time for dinner!"

"I only wish it was," the March Hare said to himself in a whisper.

"That would be grand, certainly," said Alice thoughtfully; "but, then—I shouldn't be hungry for it, you know."

"Not at first, perhaps," said the Hatter; "but you could keep it to half-past one as long as you liked."

"Is that the way *you* manage?" Alice asked.

The Hatter shook his head mournfully.

"Not I!" he replied.

"We quarreled last March—just before

he went mad, you know" (pointing with his teaspoon at the March Hare). "It was at the great concert given by the Queen of Hearts, and I had to sing:

"Twinkle, twinkle, little bat!

How I wonder what you're at!"

You know the song, perhaps?"

"I've heard something like it," said Alice.

"It goes on, you know," the Hatter continued, "in this way:

"Up above the world you fly,
Like a tea-tray in the sky.
Twinkle, twinkle—"



The March Hare took the watch and looked at it gloomily; then he dipped it into his tea, and looked at it again, but could think of nothing better to say than his first remark: "It was the best butter, you know."

Here the Dormouse shook itself, and began singing in its sleep: "*Twinkle, twinkle, twinkle, twinkle—*" and went on so long that they had to pinch it to make it stop.

"Well, I'd hardly finished the first verse," said the Hatter, "when the Queen bawled out, 'He's murdering the time! Off with his head!'"

"How dreadfully savage!" exclaimed Alice.

"And ever since that," the Hatter went on in a mournful tone, "he won't do a thing I ask. It's always six o'clock now."

A bright idea came into Alice's head. "Is that the reason so many tea-things are put out here?" she asked.

"Yes, that's it," said the Hatter with a sigh; "it's always tea-time, and we've no time to wash the things between whiles."

"Then you keep moving round, I suppose?" said Alice.

"Exactly so," said the Hatter; "as the things get used up."

"But when you come to the beginning again?" Alice ventured to ask.

"Suppose we change the subject," the March Hare interrupted, yawning. "I'm getting tired of this. I vote the young lady tells us a story."

"I'm afraid I don't know one," said Alice, alarmed at the proposal.

"Then the Dormouse shall!" they both cried. "Wake up, Dormouse!" And they pinched it on both sides at once.

The Dormouse slowly opened its eyes. "I wasn't asleep," it said, in a hoarse feeble voice. "I heard every word you fellows were saying."

"Tell us a story," said the March Hare.

"Yes, please do!" pleaded Alice.

"And be quick about it," added the Hatter, "or you'll be asleep again before it's done."

"Once upon a time there were three

little sisters," the Dormouse began in a great hurry; "and their names were Elsie, Lacie, and Tillie; and they lived at the bottom of a well—"

"What did they live on?" said Alice, who always took a great interest in questions of eating and drinking.

"They lived on treacle," said the Dormouse, after thinking a minute or two.

"They couldn't have done that, you know," Alice gently remarked; "they'd have been ill."

"So they were," said the Dormouse; "very ill."

Alice tried a little to fancy to herself what such an extraordinary way of living would be like, but it puzzled her too much, so she went on: "But why did they live at the bottom of a well?"

"Take some more tea," the March Hare said to Alice very earnestly.

"I've had nothing yet," Alice replied in an offended tone, "so I can't take more."

"You mean you can't take *less*," said the Hatter. "It's very easy to take *more* than nothing."

"Nobody asked *your* opinion," said Alice.

"Who's making personal remarks now?" the Hatter asked triumphantly.

Alice did not quite know what to say to this, so she helped herself to some tea and bread and butter, and then turned to the Dormouse and repeated her question: "Why did they live at the bottom of a well?"

The Dormouse again took a minute or two to think about it, and then said: "It was a treacle-well."

"There's no such thing," Alice was beginning very angrily, but the Hatter and the March Hare went "Sh! sh!" and the Dormouse sulkily remarked: "If you can't be civil, you'd better finish the story for yourself."

"No, please go on," Alice said very



The Mad Hatter singing, "Twinkle, twinkle, little bat!"



The Dormouse had closed its eyes while telling its very absurd story, and was going off into a doze; but, on being pinched by the Hatter, it woke up again, and continued its tale, though it never got to the end of it.

humbly; "I won't interrupt you again. I dare say there may be *one*."

"One, indeed!" said the Dormouse indignantly. However, it consented to go on. "And so these three little sisters—they were learning to draw, you know—"

"What did they draw?" said Alice, quite forgetting her promise.

"Treacle," said the Dormouse, without considering at all this time.

"I want a clean cup," interrupted the Hatter. "Let's all move one place on." He moved on as he spoke and the Dormouse followed him; the March Hare moved into the Dormouse's place, and Alice rather unwillingly took the place of the March Hare.

The Hatter was the only one who got any advantage from the change, and Alice was a good deal worse off than before, as the March Hare had just upset the milk-jug into his plate. Alice did not wish to offend the Dormouse again, so she began very cautiously: "But I don't understand. Where did they draw the treacle from?"

"You can draw water out of a water-well," said the Hatter; "so I should think you could draw treacle out of a treacle-well—eh, stupid?"

"But they were *in* the well," Alice said to the Dormouse, not choosing to notice this last remark.

"Of course they were," said the Dormouse—"well in."

This answer so confused poor Alice that she let the Dormouse go on for some time without interrupting it.

"They were learning to draw," the Dormouse went on, yawning and rubbing its eyes, for it was getting very sleepy; "and they drew all manner of things—everything that begins with an M—"

"Why with an M?" said Alice.

"Why not?" said the March Hare.

Alice was silent.

The Dormouse had closed its eyes by this time, and was going off into a doze; but, on being pinched by the Hatter, it woke up again with a little shriek, and went on: "—that begins with an M, such as mouse-traps, and the moon, and mem-

ory, and muchness—you know you say things are ‘much of a muchness’—did you ever see such a thing as a drawing of a muchness?”

“Really, now you ask me,” said Alice, confused, “I don’t think—”

“Then you shouldn’t talk,” said the Hatter.

This piece of rudeness was more than Alice could bear; she got up in disgust, and walked off. The Dormouse fell asleep instantly, and neither of the others took the least notice of her going, though

she looked back once or twice, half hoping that they would call after her.

The last time she saw them, they were trying to put the Dormouse into the teapot.

“At any rate, I’ll never go *there* again,” said Alice, as she picked her way through the wood. “It’s the stupidest tea-party I ever was at in all my life.”

What happened after Alice got away from the Mad Tea-Party, and the other adventures that befell her before the end of her story, are told on page 1333.

THE FABLES OF ÆSOP THE SLAVE

THE OLD MAN AND HIS SONS

AN old man had three sons who were always quarreling with one another. The father often tried to reconcile them, and told them how foolish it was to quarrel; but his advice had no effect upon them.

So one day he called his three sons and gave them a bundle of firewood, telling them each to try if with all his might and strength he could break the bundle of sticks into two pieces. Each one tried without success, for the sticks were so closely and tightly bound together that no man’s strength was sufficient to break them.

Then the father untied the bundle, and told his sons to break the sticks one by one, which they were able to do quite easily.

Then he said to them: “My boys, you see how important it is to keep together. When you are united in the bonds of friendship, no one can hurt you; but if you quarrel and separate, people will be able to injure you.”

Union is strength.

THE CRAB AND HER MOTHER

EVERYONE who has been to the seaside and has watched the little crabs in the rock pools, will have noticed that they generally walk sideways. It is said that once upon a time a mother crab scolded her daughter for walking sideways, pointing out that it looked very awkward, and was quite unlike the way the rest of the world walked.

“Indeed, mother,” replied the young crab, “I walk as well as ever I can; but if you would like me to do it in a different way, I wish you would set me an example, and show me the proper way

to walk, because I have always noticed that you walk sideways yourself.”

Example is better than precept.

THE TORTOISE AND THE EAGLE

A TORTOISE who had grown tired of crawling about on the ground and wanted to see the world, published a notice that if any bird would take him up into the air and show him the world, he would reward him by giving to him a number of precious stones which he knew were hidden in a certain place in the ground.

The eagle undertook to do as he wished, and carried the tortoise high up in the air to look round. Then he asked him to tell him where the precious stones were hidden, but the tortoise, who had never seen any precious stones, of course could not keep his promise, so the eagle dropped him, and he was dashed to pieces on the rocks far below.

People who do not keep their promises are sure to suffer for it sooner or later.

THE ASS AND HIS DRIVER

AN ass that was being driven along the road by his master started on ahead, and leaving the beaten track, made as fast as he could for the edge of a precipice. When he was just on the point of falling over, his master ran up, and seizing him by the tail, endeavored to pull him back; but the ass resisting and pulling the contrary way, the man let go his hold, saying: “Well, Jack, if you will be master, I cannot help it. A willful beast must go his own way.” And down went the foolish beast to his death.

Headstrong people suffer for their own ill-advised deeds.

THE SELFISH GIANT

BY OSCAR WILDE

EVERY afternoon, as they were coming from school, the children used to go and play in the Giant's garden.

It was a large lovely garden, with soft green grass. Here and there over the grass stood beautiful flowers like stars, and there were twelve peach-trees that in the Springtime broke out into delicate blossoms of pink and pearl, and in the Autumn bore rich fruit. The birds sat on the trees and sang so sweetly that the children used to stop their games in order to listen to them. "How happy we are here!" they cried to each other.

One day the Giant came back. He had been to visit his friend the Cornish ogre, and had stayed with him for seven years. After the seven years were over he had said all that he had to say, for his conversation was limited, and he determined to return to his own castle. When he arrived he saw the children playing in the garden.

"What are you doing here?" he cried in a very gruff voice, and the children ran away.

"My own garden is my own garden," said the Giant; "anyone can understand that, and I will allow nobody to play in it but myself." So he built a high wall around it, and put up a notice-board:

TRESPASSERS
WILL BE
PROSECUTED

He was a very selfish Giant.

The poor children had now nowhere to play. They tried to play on the road, but the road was very dusty and full of hard stones, and they did not like it. They used to wander round the high wall when their lessons were over, and talk about the beautiful garden inside. "How happy we were there," they said to each other.

Then the Spring came, and all over the country there were little blossoms and little birds. Only in the garden of the Selfish Giant it was still Winter. The birds did not care to sing in it as there were no children, and the trees forgot to blossom. Once a beautiful flower put its head out from the grass, but when it saw the noticeboard it was

so sorry for the children that it slipped back into the ground again, and went off to sleep. The only people who were pleased were the Snow and the Frost. "Spring has forgotten this garden," they cried, "so we will live here the year round." The Snow covered up the grass with her great white cloak, and the Frost painted all the trees silver. Then they invited the North Wind to stay with them, and he came. He was wrapped in furs, and he roared all day about the garden, and blew the chimney-pots down. "This is a delightful spot," he said; "we must ask the Hail on a visit." So the Hail came. Every day for three hours he rattled on the roof of the castle till he broke most of the slates, and then he ran round and round the garden as fast as he could go. He was dressed in grey, and his breath was like ice.

"I cannot understand why the Spring is so late in coming," said the selfish Giant, as he sat at the window and looked out at his cold white garden; "I hope there will be a change in the weather."

But the Spring never came, nor the Summer. The Autumn gave golden fruit to every garden, but to the Giant's garden she gave none. "He is too selfish," she said. So it was always Winter there, and the North Wind, and the Hail, and the Frost, and the Snow danced about through the trees.

One morning the Giant was lying awake in bed when he heard some lovely music. It sounded so sweet to his ears that he thought it must be the king's musicians passing by. It was really only a little linnet singing outside his window, but it was so long since he had heard a bird sing in his garden that it seemed to him to be the most beautiful music in the world. Then the Hail stopped dancing over his head, and the North Wind ceased roaring, and a delicious perfume came to him through the open casement. "I believe the Spring has come at last," said the Giant; and he jumped out of bed and looked out.

What did he see?

He saw a most wonderful sight. Through a little hole in the wall the children had crept in, and they were

sitting in the branches of the trees. In every tree that he could see there was a little child. And the trees were so glad to have the children back again that they had covered themselves with blossoms, and were waving their arms gently above the children's heads. The birds were flying about and twittering with delight, and the flowers were looking up through the green grass and laughing. It was a lovely scene, only in one corner it was still Winter. It was the farthest corner of the garden, and in it was standing a little boy. He was so small that he could not reach up to the branches of the tree, and he was wandering all round it, crying bitterly. The poor tree was still quite covered with frost and snow, and the North Wind was blowing and roaring above it. "Climb up! little boy," said the Tree, and it bent its branches down as low as it could; but the boy was too tiny.

And the Giant's heart melted as he looked out. "How selfish I have been!" he said; "now I know why the Spring would not come here. I will put that poor little boy on the top of the tree, and then I will knock down the wall, and my garden shall be the children's playground for ever and ever." He was really very sorry for what he had done.

So he crept downstairs and opened the front door quite softly, and went out into the garden. But when the children saw him they were so frightened that they all ran away, and the garden became Winter again. Only the little boy did not run for his eyes were so full of tears that he did not see the Giant coming. And the Giant stole up behind him and took him gently in his hand, and put him up into the tree. And the tree broke at once into blossom, and the birds came and sang on it, and the little boy stretched out his two arms and flung them round the Giant's neck, and kissed him. And the other children, when they saw that the Giant was not wicked any longer, came running back, and with them came the Spring. "It is your garden now, little children," said the Giant, and he took a great axe and knocked down the wall. And when the people were going to market at twelve o'clock they found the Giant playing with the children in the most beautiful garden they had ever seen.

All day long they played, and in the evening they came to the Giant to bid him good-bye.

"But where is your little companion," he said: "the boy I put into the tree?" The Giant loved him the best because he had kissed him.

"We don't know," answered the children; "he has gone away."

"You must tell him to be sure and come here to-morrow," said the Giant. But the children said they did not know where he lived, and had never seen him before; and the Giant felt very sad.

Every afternoon, when school was over, the children came and played with the Giant. But the little boy whom the Giant loved was never seen again. The Giant was very kind to all the children, yet he longed for his first little friend, and often spoke of him. "How I would like to see him!" he used to say.

Years went over, and the Giant grew very old and feeble. He could not play about any more, so he sat in a huge armchair, and watched the children at their games, and admired his garden. "I have many beautiful flowers," he said, "but the children are the most beautiful flowers of all."

One winter morning he looked out of his window as he was dressing. He did not hate the Winter now, for he knew that it was merely the Spring asleep, and that the flowers were resting.

Suddenly he rubbed his eyes in wonder, and looked and looked. It certainly was a marvelous sight. In the farthest corner of the garden was a tree quite covered with lovely white blossoms. Its branches were all golden, and silver fruit hung down from them, and underneath it stood the little boy he had loved.

Downstairs ran the Giant in great joy, and out into the garden. He hastened across the grass, and came near to the child. And when he came quite close his face grew red with anger, and he said: "Who hath dared to wound thee?" For on the palms of the child's hands were the prints of two nails, and the prints of two nails were on the little feet.

"Who hath dared to wound Thee?" cried the Giant; "tell me, that I may take my big sword and slay him."

"Nay!" answered the child; "but these are the wounds of Love."

"Who art Thou?" said the Giant, and a strange awe fell on him, and he knelt before the little child.

And the child smiled on the Giant, and said to him: "You let me play once in your garden; to-day you shall come

with Me to My garden, which is Paradise."

And when the children ran in that afternoon, they found the Giant lying dead under the tree, all covered with white blossoms.

DESTRUCTION OF A SHIP BY A WHALE

This is a true story of a whale hunt, undertaken by the good ship *Ann Alexander* of New Bedford sailing under Captain J. S. Deblois. We have given it to you in the very words used by the captain, who displayed great bravery and good judgment in the difficult enterprise.

THE ship *Ann Alexander*, Captain J. S. Deblois, sailed from New Bedford, Mass., June 1st, 1850, for a cruise in the South Pacific for sperm whale. Having taken about five hundred barrels of oil in the Atlantic, the ship proceeded on her voyage to the Pacific. Nothing of unusual interest occurred until, when passing Cape Horn, one of the men, named Jackson Walker, of Newport, N. H., was lost overboard in a storm. Reaching the Pacific, she came up the coast and stopped at Valdivia, on the coast of Chili, for fresh provisions, and the 31st of May last, she called at Paita for the purpose of shipping a man. The vessel proceeded on her return voyage to the South Pacific.

On the 20th of August last she reached what is well known to all whalers as the "Off-shore ground," in latitude five degrees fifty minutes south, longitude one hundred and twenty degrees west. In the morning of that day, at about nine o'clock, whales were discovered in the neighborhood, and about noon, the same day, they succeeded in making fast to one. Two boats had gone after the whales, the larboard and the starboard, the former commanded by the first mate, the latter by Captain Deblois. The whale, which they had struck, was harpooned by the larboard boat. After running some time, the whale turned upon the boat, and rushing at it with tremendous violence lifted open its enormous jaws, and taking the boat in, actually crushed it into fragments as small as a common chair! Captain Deblois immediately struck for the scene of the disaster with the starboard boat, and succeeded, against all expectation, in rescuing the whole crew of the boat—nine in number!

There were now eighteen men in the starboard boat, consisting of the cap-

tain, the first mate, and the crews of both boats. The frightful disaster had been witnessed from the ship, and the waist boat was called into readiness, and sent to their relief. The distance from the ship was about six miles. As soon as the waist boat arrived, the crews were divided, and it was determined to pursue the same whale, and make another attack upon him. Accordingly, they separated, and proceeded at some distance from each other, as is usual on such occasions, after the whale. In a short time, they came up to him, and prepared to give him battle. The waist boat, commanded by the first mate, was in advance. As soon as the whale perceived the demonstration made upon him, he suddenly turned in his course, and making a tremendous dash at this boat, seized it with his wide-spread jaws, and crushed it to atoms, allowing the men barely time to escape by throwing themselves into the ocean.

Captain Deblois, again seeing the perilous condition of his men, at the risk of meeting the same fate, directed his boat to hasten to their rescue, and in a short time succeeded in saving them all from a death little less horrible than that from which they had twice as narrowly escaped. He then ordered the boat to put for the ship as speedily as possible, and no sooner had the order been given than they discovered the monster of the deep making toward them with his jaws widely extended. Fortunately, the monster came up and passed them at a short distance. The boat then made her way to the ship and they all got on board in safety.

After reaching the ship a boat was dispatched for the oars of the demolished boats, and it was determined to pursue the whale with the ship. As soon as the boat returned with the oars,

sail was set, and the ship proceeded after the whale. In a short time she overtook him, and a lance was thrown into his head. The ship passed on by and immediately afterwards they discovered that he was making for it. As he came up near her, they hauled on the wind, and suffered the monster to pass. After he had fairly passed, they took off to overtake and attack him again. When the ship had reached within fifty rods of him, they discovered that the whale had settled down deep below the surface of the water, and, as it was near sundown, they concluded to give up the pursuit.

Captain Deblois was at this time standing in the night-heads on the larboard bow, with lance in hand, ready to strike the monster a deadly blow should he appear. The ship was moving about five knots, when he discovered the whale rushing towards her at the rate of about fifteen knots! In an instant the monster struck the ship with tremendous violence, shaking her from stem to stern! She quivered under the violence of the shock, as if she had struck upon a rock! Captain Deblois immediately descended into the forecabin, and there, to his horror, discovered that the monster had struck the ship two feet from the keel, abreast the foremast, knocking a great hole entirely through her bottom. Springing to the deck, he ordered the mate to cut away the anchors and get the cables overboard, to keep the ship from sinking, as she had a large quantity of pig-iron on board. In doing this the mate succeeded in getting only one anchor and one cable clear, the other having been fastened around the foremast. The ship was then sinking rapidly. The captain went to the cabin, where he found three feet of water; however, he succeeded in procuring a chronometer, sextant and chart.

Reaching the decks, he ordered the boats to be cleared away, and water and provisions to be taken, as the ship was keeling over. He again descended to the cabin, but the water was rushing in so rapidly that he could procure nothing. He then came up on deck, ordered all hands into the boats, and was the last to leave the ship, which he did by throwing himself into the sea, and swimming to the nearest boat! The ship was on her beam end, top-gallant yards under

the water. They then pushed off some distance, expecting her to sink in a very short time. Upon an examination of the stores they had been able to save, it was discovered that they had only twelve quarts of water, and not a mouthful of provisions of any kind! The boats contained eleven men each, were leaky, and night was coming on. They were obliged to bale them all night to keep them from sinking!

Next day, at daylight, they returned to the ship, their intention being to cut away the masts, but fearful that the moment the masts were cut away the ship would go down, no one dared to venture on board but the captain. With a single hatchet, he went on board, cut away the masts, and the ship was righted. The boats then came up, and the men by the sole aid of spades, cut away the chain cable from around the foremast, which got the ship nearly on her keel. The men then tied ropes around their bodies, got into the sea and cut a hole through the decks to get out provisions. They could procure nothing but five gallons of vinegar and twenty pounds of wet bread. The ship threatened to sink, and they deemed it prudent to remain by her no longer, so they set sail in their boats.

On the 22d of August, at about five o'clock, P.M., they had the indescribable joy of seeing a ship in the distance. They made signal and were soon answered, and in a short time they were reached by the ship Nantucket, of Nantucket, Mass. Captain Gibbs, who took them all on board, clothed and fed them, and extended to them in every way the greatest possible hospitality.

On the succeeding day Captain Gibbs went to the wreck of the ill-fated Ann Alexander, for the purpose of trying to procure something, but, as the sea was rough, and the attempt considered dangerous, he abandoned the project. The Nantucket then set sail for Paita, where she arrived on the 15th of September, and where she landed Captain Deblois and his men. Captain Deblois was kindly received and hospitably entertained at Paita by Captain Bathurst, an English gentleman, residing there, and subsequently took passage on board the schooner, Providence, Captain Starbuck, for Panama.

THE NEXT STORIES ARE ON PAGE 1333.

The Book of All Countries

WHAT THIS STORY TELLS US

WE are going now to read about Italy in this chapter and in two following ones in the Book of All Countries. No doubt we shall become so interested in our subject that we shall want to go on and read also The First Great Men of Rome, The Emperors of Rome, The Makers of Venice and The Builders of Florence in the Book of Men and Women. These will tell us more about the great men mentioned in these chapters. Then, in the Book of Literature we shall find chapters about the writers of Italy and in the Book of Art chapters telling of the beautiful sculpture and painting which Italian artists have given to the world so abundantly. When we have read all these we shall be fitted for many enjoyable hours in the picture galleries and museums of our own country and of Europe, and particularly happy when the moment arrives for a visit to the lovely little peninsula jutting into the Mediterranean, where almost every spot suggests a story or an incident.

THE GRANDEUR THAT WAS ROME

IN our journeys together through the countries of the Old World we have often touched upon the prowess of Rome. She brought to an end the ancient stories of Greece, Persia and Egypt, and then gave shape, as it were, to the beginning of most of the countries of modern Europe. Some of us have seen the grand ruins still standing in various countries, which show how magnificent were the buildings, how skillful the engineering of the Romans; and in all the countries where they settled, enough of their treasures have been dug up and collected for study to bring us face to face with their owners. Besides this, many of their books have been handed down to us, and their language, their laws and their customs are still influencing our world to-day.

For the beginnings of the story of the strong people who have thus linked the past with the present, we turn once more to the great steppe land which leads into the heart of Asia, whence poured out the migrations of Aryan peoples seeking new homes in the West. We read in the story of Greece, beginning on page 1069, how the tribes of the Hellenes swarmed into the peninsula that we now call Greece.

CONTINUED FROM 1082



Augustus.

Other tribes of near kindred to the Hellenes journeyed, probably by land across the passes of the snowy Alps, to the boot-shaped peninsula now known as Italy. By degrees various branches of the tribes, with their families and their herds of cattle, spread down the long peninsula. Some settled on the wooded heights of the Apennines, where the air blows so keenly and the gorges are so clear-cut by the dashing streams hurrying to the plains below. Other tribes preferred those plains where the fields were very fertile. The Umbrians found a resting-place round the head of the lovely Adriatic; the Latins pushed on south of the yellow Tiber.

To the north of the Tiber there settled quite early along the west coast a vigorous, intelligent people of different race from the rest of the Italian tribes, called by us the Etruscans. Possibly these Etruscans were connected with the Hellenes, or Greeks. Some students think they came from Asia Minor, but nothing certain is yet known of their origin. Among the remains from Greece and Rome in the great museums are many from Etruria, chiefly from the tombs that have interesting wall-paintings. The red and

black vases are thought to be copied from those of Greece. We have not learned to read the language of their inscriptions. When these Etruscans are first heard of, they were far in advance of their Italian neighbors, making roads and canals, and building immense walls and towers for defense.

We do not know for certain when the Latins began to give up living in small villages consisting of groups of huts, which was the way of living of all the Italian tribes in the earliest days. By degrees they came to fortify a hill-top by building a wall, which made a safe refuge for a meeting-place. Finally independent cities grew up, and often there was warfare with neighbors.

About fourteen miles from the mouth of the Tiber is a group of seven hills, one of which was thus chosen as a place of refuge. It became a city-state and was named Rome.

It has been said that the whole history of the world depended on the position of this group of hills. They are close together, and are near the sea. They are situated in the middle of Italy, and in the middle of Europe as it was known in ancient times, and also near the middle of the Mediterranean Sea, once the world's great, busy highway.

HOW THE BEGINNING OF ROME IS LOST IN THE MISTS OF THE PAST

We do not know when the foundation of Rome took place; some say 753 years before Christ, at the time when the "sons of Asshur" were so powerful in Assyria, and Egypt had already passed its greatest glory. The later Romans reckoned their years from the date of the founding of the city, as we do ours from the birth of Christ. In all countries it is very difficult to say when the old legends of beginnings end and the certain facts of history begin.

A race like the Romans, who rose to such immense power, naturally liked to feed their national pride by believing they were descended from gods and heroes; wonderful legends arose about their origin, and in process of time these were so grandly told by poets and historians that the world refuses even now to give up the attractive beliefs of long centuries. We are led very willingly back again to the siege of Troy, which scholars now place earlier than a thousand years before the birth of Christ, and watch its bitter

ending for Priam and his family and friends. Æneas, whose father was Anchises, one of the Trojan heroes, and whose mother was the Goddess of Love and Beauty, escaped, the legend tells us, from the dreadful slaughter, carrying his old father on his back.

After many thrilling adventures in the Mediterranean, including a visit to the Phœnician colony of Carthage, in which his goddess mother gave him much help, Æneas found his way to the west coast of Italy, where he married the daughter of Latinus, the king of the country, and peaceably succeeded him as king of the Latins.

THE STRANGE STORY OF ROMULUS, THE FOUNDER OF ROME, AND THE WOLF

Many generations after, one of the daughters of the royal house had twin sons. Their father was the God of War. They grew up to strong manhood in spite of efforts to destroy them by casting them out upon the Tiber. A she-wolf nursed the boys till a shepherd found them and brought them up. They were named Romulus and Remus. Romulus succeeded in founding a colony and city on one of the group of seven hills near the mouth of the Tiber. This was the famous Palatine Hill, and this was the beginning of Rome.

The old stories give wonderful details of how the first Romans obtained their wives from the Sabine people living on another hill of the group, called later the Quirinal Hill, by running away with them at a joint festival. However this may be, the fact remains that one by one the seven hills were absorbed into one great walled city, made up of hills and valleys, green fields as well as dwelling-houses, with a fort on the Capitoline Hill. The Romans ever welcomed strangers to live within their safe inclosure, and traded with their neighbors around; they also fought continually with these neighbors, especially with the Etruscans, who, besides being foes, were the teachers of the Romans.

THE WALLS OF ROME, WHICH INCLOSED A STATE AS WELL AS A CITY

Many and interesting are the glimpses given us of Rome in its cradle, in the story of the rule of the kings who succeeded Romulus, during a period of about two hundred and fifty years. We see the sober, hard-working peasants developing by their patient toil qualities that

made their race the best soldiers in the world. Marvelous were the great works of the kings, such as the city walls, which inclosed a state as well as a city, and the great sewers by which the marshes at the foot of the hills were drained, some of the arches of which were high enough for loaded hay-carts to pass beneath them. There was the fine Circus Maximus, in one of the valleys, for games and races; and the picturesque stalls of the workers at various trades were set up round the market place, or Forum. Fine, too, were the temples rising up near the Forum and on the hill above, a faint shadow, as it were, of the glories that came afterward.

But the people grew to hate the rule of the kings, some of whom were Etruscan rulers, and at last they were driven out, and a republic was set up about five hundred years before Christ. The chief officers of the republic were the consuls, and there was a council called the senate.

Lord Macaulay, in the *Lays of Ancient Rome*, gives vivid pictures of these old times when Rome, the youngest of the Latin states, was developing the character and strength by which she was able not only to rise to their leadership, but to pass on to the conquest of the world.

HOW THE RULE OF THE FATHERS BECAME THE RULE OF THE NOBLES

The simple family life, the hard-working peasants, the well-trained soldiers, the stern obedience to law were some of the factors that led on to success. At first the state was made up of a number of families, each ruled by the fathers, or heads, called the *patres*. The king presided over the council formed by the *patres*, who became the *patricians*, or nobility. The new people who crowded into Rome for trade or shelter were called by the *patres*, who looked down on them, the *plebs*, or crowd. Thus began a government by nobles, the patricians, over numbers of people below them in wealth and position, the plebeians.

These plebeians had no share in the government, no voice or vote in settling public affairs. The patricians became more and more unfair and unkind to the plebeians as time went on, till at last the plebeians would no longer endure their oppression, and Rome, torn in pieces at home, was unable to push conquests abroad for a long while. But the Roman people gained so much training in the long struggle, in the way of obedience, self-

control and perseverance, and in wisdom as to what was best for the general life of all, that they became thoroughly fitted in the course of years, not only to conquer the world, but to govern it as well.

THE STRUGGLE OF THE ROMAN PEOPLE FOR THE RIGHT TO MAKE THEIR LAWS

After a time, as we have seen, the kingdom became a republic, but the difficulties of settling the new republic were great and prolonged. The plebeians slowly gained their rights, not by riots or bloodshed, but by obeying the laws, however much they disliked them, and by patiently striving for one step at a time. They obtained their own magistrates, who were called tribunes, and the privilege of owning land, and at last they helped to make the laws they had to obey, and gained the right to hold the highest offices in the state. Two stories stand out prominently in the history of the small wars that went on from time to time with the tribes around during the struggles of the plebeians against the patricians.

One is that of Coriolanus, the brave man who, shut in alone in the enemy's city, yet managed to take it. Afterward, the story says, he was exiled by his countrymen and went over to the enemy, even leading their army against Rome. In vain did the senators and priests plead with him. It was only when his wife and his mother begged him to spare Rome that he gave in, and led the army back to Volsci.

Then the story of Cincinnatus shows us how simple were the old customs of Rome and how all citizens served the state. We see the curly-haired Cincinnatus at work plowing on his farm when messengers come to ask him to get the consul and his army out of a difficulty. Cincinnatus called for his cloak and went at once, and succeeded in doing what was wanted. He then returned home to his farming.

THE FIERCE GAULS WHO DROVE THE ROMANS IN TERROR FROM THEIR CITY

All the time when there were little wars such as these in which the stories of Coriolanus and Cincinnatus shine out, Rome had always in her mind her old enemies the Etruscans. These were wealthy traders. But the time came when their power began to decline. The Greeks won a great sea-victory over them; and then came the Gauls, who were settled all

over the northern parts of Italy. These attacked the Etruscans on land, and the Romans attacked them from the south.

In the year 309 before Christ the tall and terrible Gauls, with their fair hair and flashing eyes, came down upon Rome itself, after defeating a Roman army of forty thousand men. We are told that "their harsh music and discordant clamors filled all places with a horrible din," and their long swords cut through the helmets of the Romans, making them flee in terror and panic.

No one thought of defending the walls of the city; the Capitol fortress on the Capitoline Hill alone held out, as we read in the story of the Sacred Geese, on page 3982, and the white-bearded priests sat like statues in the Forum of the deserted city. The Gauls killed the priests, set fire to the city, demanded a heavy ransom, and departed. In this fire the city records perished, and with them all that would have given us actual facts about the thrilling story of the past.

THE ROMANS LEARNED TO FIGHT AGAINST ELEPHANTS. THEY WON ITALY

The Romans learned much from their war with the Gauls, and steadily pursued their conquests over the rest of the states of the peninsula. They conquered the brave Samnites and the Etruscans; they had long wars with the Greek cities in the south. One of these was Tarentum. The people were one day sitting in an open-air theatre, like the one in Athens, listening to one of the splendid Greek plays; when they looked up, they saw the Roman ships sailing close to their harbor. So the war began, and they asked Pyrrhus of Greece to help them. It took the Romans five years to win.

As the war went on, they learned some useful lessons, such as how to fight against elephants and how to improve their cavalry. When Pyrrhus went home, in the year 274 before Christ, after losing nearly all his troops, all the peninsula of Italy had passed to Rome. The splendid Greek cities of the south furnished beautiful works of art and many articles of luxury hitherto almost unknown to the victors.

We can readily understand how difficult the long, narrow country has always been to govern from one centre. The Romans had two plans by which to hold their conquests, and with these we are already familiar, because they were the same as

were used in Britain. Colonies were founded, in which Roman citizens, who never forgot Rome, were sent to live and work, and teach others to do the same. Then fine roads were made to connect the colonies and the camps of the soldiers with the capital, so that troops could travel quickly along these roads and trade-routes could be established.

A NAVY THAT WAS COPIED FROM A WRECK, AND SAILORS WHO ROWED IN SAND

Soon after Pyrrhus had returned home, the tremendous wars between Rome and Carthage began. Here you should be careful to remember that Carthage was a colony of Phœnicia, and these wars are generally called the Punic, or Phœnician, Wars. The western half of the north coast of Africa had been conquered by the Carthaginians, but the natives had not been well treated by them; so when they had to serve in the armies of their conquerors, they had none of the enthusiasm for their cause which the Roman soldiers had for theirs—they cared only for their pay.

The war began in Sicily, the lovely island midway between Rome and Carthage, and the Romans soon found that they must have a navy. With great courage and energy they set to work to build ships, taking a stranded Carthaginian vessel as a model. While the sawing and hammering were going on, crews were in training, sitting on benches on the shore practicing rowing in the sand.

Great was the enthusiasm in Rome when the first naval hero returned after the first sea-victory, which was gained at Mylæ in the year 260 before Christ. But there were many ups and downs in the campaign. The great Roman fleet which was afterward built defeated the enemy and carried to Africa an army which, under Regulus, had much success, till the splendid cavalry and the huge elephants of the Carthaginians turned the tide of war once more. We read the story of the bravery of Regulus on page 125.

THE DELIGHT OF THE PEOPLE WHEN ELEPHANTS FIRST WENT TO ROME

In a later fight 120 of the "huge earth-shaking beasts" were taken and sent to Rome, to the great delight of the people, who had never seen elephants before. After twenty-three years of fighting, the First Punic War came to an end, and peace was made by that most gallant general and wise man, Hamilcar,

ENEMIES OF ROME IN VICTORY AND DEFEAT



Crossing the Alps amid the greatest difficulties, Hannibal, the famous Carthaginian general, defeated the Romans again and again, sweeping everything before him. After the battle of Cannæ, when he annihilated a Roman army, if his countrymen had sent him fresh supplies, he would probably have completely conquered Rome. But the reinforcements never came, and later Hannibal was recalled to Africa, where he was defeated by the Romans. In this picture we see Hannibal's army crossing the river Rhone.



The Goths, who had been driven from their old homes between the Black and the Baltic Seas by the Huns, entered the Roman Empire for protection about the year 375. They were incorporated in the empire, but later rebelled against the emperor, and electing Alaric, one of their officers, king, entered Italy and three times besieged Rome. Twice the senate bribed them to retire, but the third time they took the city, and in the year 408 plundered it and committed many excesses. Here we see the Goths entering Rome.

who was able to see when it was time to give in. Sicily was made a Roman province, and Sardinia and Corsica also became provinces a few years later.

Hamilcar had a son who was a great general, too. This was Hannibal. We are told that he worked day and night, and thought of sleep only when there remained nothing else to be done.

HANNIBAL'S TERRIBLE MARCH ACROSS THE ALPS, AND HIS CAMPAIGN IN ITALY

After a useful campaign in Spain, where his father had been successful in forming a province for the Carthaginians, he made one of the great marches of history. Leading his army of fifty thousand foot soldiers and ten thousand horsemen, with numbers of elephants, he passed northward along the east coast of Spain, by the eastern "gate" of the Pyrenees, round the Gulf of Lions, across the swift Rhone, and then over the Alps themselves to the plains of north Italy. So rapid was his march that at every spot where the Romans had hoped to stop him they always arrived too late.

It is a pitiful thing to remember the lives that were sacrificed on the slippery, icy paths and the steep mountainsides of the Alps. The cold was intense, and the people of the country rolled down great boulders upon them, and attacked them from behind, just as the Swiss were to do to the Austrians many centuries later.

Before long all the valley of the Po was conquered by Hannibal, and he marched triumphantly down the peninsula, through Etruria, taking the Romans by surprise in the morning mist on Lake Trasimene. A great attempt to get rid of Hannibal was made the next year at Cannæ, but all the best Roman soldiers were killed.

THE DESTRUCTION OF CARTHAGE AND THE CONQUEST OF GREECE

But the Romans, as usual, learned much from defeat. Though they had lost great battles, they skillfully wore out the strength of the enemy in small engagements, and then patiently waited, until at last the great Scipio drove the Carthaginians out of Spain and defeated them in Africa, so that they had to send for Hannibal to come home. In the year 202 before Christ Scipio destroyed at Zama, near Carthage, the army that had harassed Italy for sixteen years.

Rome was now the chief state in the West, and was supreme, owing to her

ships, in the Mediterranean. The time had now come to turn her face eastward. There had been a conflict with Macedonia during the Second Punic War, and when that mighty struggle was finished, the Roman legion, light troops, and the Macedonian phalanx, a solid body of bronze-clad warriors, met in Thessaly. The legions were successful and passed on, after a time, to set foot in Asia, where they won a tremendous victory at Magnesia under the brother of the great Scipio, who had, after his successes in Africa, been given the name Africanus. A terrible battle at Pydna, in Macedonia, settled the fate of the country in the year 168 before Christ.

In the same year Rome found an excuse to destroy Carthage, because it had not kept strictly to the hard terms of the peace made at the end of the Second Punic War. The story is related by an eye-witness. The innocent people were totally destroyed, and the city was completely leveled with the ground.

THE CITY ON THE SEVEN HILLS THAT HELD SWAY IN EAST AND WEST

Among the Roman remains in the British Museum are shown some beautiful tessellated pavements from Carthage, once pressed by the feet of its prosperous citizens. One can easily imagine that he hears the patter of the children's light, dancing steps, as well as the slow, heavy tread of the aged, in the days when Carthage was great and gay. After days of horror the earth covered up these pavements in deep silence for centuries.

Spain was conquered only by most determined efforts. When at last success came to the Romans, the Mediterranean Sea had become a Roman lake, for Egypt alone still remained independent under the successors of Alexander. From Mount Taurus, in Asia Minor, to the Pillars of Hercules, in Spain, the city on the seven hills now held sway.

But in the gaining of all this world-power the soul of the victors was sadly lost. No longer were they the simple, dignified people of old days. Riches increased so that luxury killed their finest qualities and made them grasping and cruel. Slaves, ill-treated and mutinous, filled the place of the sturdy peasants whose bones now whitened distant battle-fields. So farming came to be neglected as the land passed from the care of free men into large estates owned by rich

SUNLIGHT FALLING IN THE PANTHEON



THE PANTHEON, THE OLDEST PERFECT BUILDING IN THE WORLD, OPEN TO THE SUN
The Pantheon, completed in the second century, perhaps the best preserved building of antiquity, is lighted by an opening 30 feet across, through which sunshine and rain have poured for 1,800 years.

nobles living in towns. And these estates were often worked by slaves chained together in gangs.

Many of the best men in Rome saw the dangers that were falling on their country. One of these was Cato, who hated the new luxury and much of the Greek influence that had affected the religion of the country. Ever since the days when the Romans had warred with the Greek colonies in Italy, they had been learning to take an interest in Greek books, pictures and statues. Some of the new things they learned did not tend to maintain the old rough strength.

Another danger to the Roman state was the way in which the government had changed. Hardly had the old differences between the patricians and plebeians been settled than new difficulties arose. The chief offices of state came to be held almost entirely by a few rich families, and these made up the senate which governed Rome.

THE WORTHLESS MOB THAT CAME TO ROME TO SEE THE CRUEL GAMES

The senate, to get its own way, allowed the rich traders to be as oppressive as they pleased in gathering the taxes in the provinces, and the common people were kept quiet and contented by bribes of food and great entertainments in the circus. These entertainments led to terrible cruelties to men and beasts as the taste of the populace became more and more lowered. It was their great delight to see lions and tigers hunted, also the feats of men called gladiators, who were trained to attack all kinds of animals and to fight each other to the death.

These games, and the gifts of free food, drew together in Rome a great mob of idle and worthless people quite unfit to take any useful part in the great empire that was governed by their city.

There was much oppression, too, in Italy itself and in the distant provinces, and bribery and unfairness of all kinds prevailed everywhere. A noble pair of brothers called the Gracchi—we read the touching story of their mother, Cornelia, on page 3811—strove hard to reform some of the evils, especially with regard to the land, so that poor people might be able to get small farms again; and in other ways they tried to take power out of the hands of the nobles and to improve the condition of the poor. Their memory was loved and honored.

HOW BAD GOVERNMENTS SHOOK THE VERY FOUNDATIONS OF ROME

But the misgovernment went on, and it became difficult to keep the enormous number of slaves in order. The army, too, so often flushed with success, became a more and more dangerous force in the state. For no longer were the Roman soldiers citizens like Cincinnatus who fought only when their country needed them. When war became so constant, soldiering became a trade, and this had a bad effect all round.

When Rome had conquered practically all the civilized peoples of the world (those that lived together in states and cities, and made and obeyed laws), she turned to the various uncivilized tribes that lived in a savage way on the outskirts of her empire, and united only in the face of a great common danger.

Marius, a powerful and brilliant general who had risen from the ranks, defeated two great tribes—the barbarian Teutons and the Cimbri—which had entered Gaul west of the Alps. He succeeded in making himself chief consul for many years. Many troubles fell on Rome at this time—troubles in Italy, in the East, in Greece and, worst of all, in Rome itself. We have the extraordinary spectacle of Rome being taken by part of her own army, under Sulla, a great enemy of Marius, so keen and bitter were the quarrels which led to ruinous civil wars.

In the first century before Christ Rome was rich in great men. One was Cicero, who had wonderful power in speaking to men and in moving them. Many of his speeches have come down to us, and through them we learn much that is interesting about those times.

THE TIME OF JULIUS CÆSAR, ONE OF THE WORLD'S GREATEST MEN

Another great man was Pompey, who cleared the Mediterranean of pirates, settled difficulties in Asia, and had much power in Rome itself. Another was Julius Cæsar, one of the greatest men in all history, great as a general, great as a statesman and great as a writer. In the year 60 before Christ he became consul with Pompey and Crassus, and succeeded in getting the governorship of Gaul. In his Commentaries on the Gallic War he has left us an account of his expeditions and of the hard work by which he conquered all the land north of the Pyrenees

and west of the Rhine. He gives an account of the south of Great Britain, which he visited twice. Gaul he bound firmly to Rome by treating the conquered people kindly after they were thoroughly beaten, by introducing Roman ideas and customs, by making roads and by buildings.

"VENI, VIDI, VICI," CÆSAR'S FAMOUS LETTER IN THREE WORDS

When at last he felt he could leave his province safely, and had also made himself known as a successful general and the "beloved of his soldiers," he was ready to carry out the plans he had made to change the government of Rome.

Crassus had been killed in battle against the Parthians, and then Pompey and Cæsar became rivals for the chief power. When the senate refused to do as Cæsar wished, he came from Gaul with his army and crossed the little river Rubicon, the boundary line of Gaul, into Italy, to fight for his cause. Pompey and the senate and the consuls all sailed away to Greece, and in sixty days Cæsar had gained all Italy.

A great battle was fought between the two generals at Pharsalia, in Greece, the next year, and Cæsar won.

For the next few years he had no rest, going from Egypt to Asia, whence he wrote his famous letter in three words, "*Veni, vidi, vici*"—meaning "I came, I saw, I conquered"—from Asia to Rome, then to Africa, thence to Spain. In the year 45 before Christ he returned to Rome master of the Roman world.

HOW THE MASTER OF THE WORLD WAS STRUCK DOWN BY HIS FRIENDS

Then he devoted his thought to new plans of government—taking most of the power from the assemblies and the senate until he was supreme in authority. In the control of the provinces he made very wise changes, giving to the provincials a chance to make the most of their lands.

Cæsar was assassinated in the senate house in the year 44 B.C. by his old friends, who thought it their duty to prevent Rome from coming under the rule of a single man. In Shakespeare's play of Julius Cæsar is a thrilling account of the tragedy, and the speech of Mark Antony over the body of Cæsar. A part of this noble speech is given on page 3929.

Civil war followed, during which time Egypt became a Roman province, as we read in the story of that country beginning on page 807. But after the death

of Mark Antony, Octavius, afterward called Augustus, the adopted son of Cæsar, slowly and carefully gathered all power into his own capable hands, till the Romans found that they could not do without him.

When he called himself *imperator*, whence comes our word emperor, it meant that he was the holder of a military command from the people. When he became censor, he could influence appointments to the senate; as *princeps*, or prince of the senate, he could always speak first at its meetings. Then he became chief magistrate of Rome and head of the national religion.

Many wise changes were introduced which brought about law and order, not only in Rome, but in Italy and the distant provinces. And so, without trouble, the ancient republic passed away and the rule by one man was set up.

AUGUSTUS, WHO RULED THE WORLD WHEN CHRIST WAS BORN

In the time of Augustus there were so many great writers in Rome—such as Virgil, who wrote the splendid poem about Æneas and the founding of the city; Livy, the historian; and Horace, the interesting poet—that to this day a period full of great writers is called an Augustan Age.

But the great epoch-making event that took place in the reign of Augustus was the birth of Jesus in the far-distant province of Syria. It was Augustus who, all unknowing, determined the place of the birth of Jesus; for the emperor ordered a census, or counting of the people, which Mary was on her way to attend when Jesus was born in the little town of Bethlehem not far from Jerusalem.

How astonished the powerful emperor and all the great men of his time would have been if they had known that it was not their fame or achievements that would so greatly influence the world, but rather the life and words of the humbly born Babe, who grew up to work in a carpenter's shop, and who later had not where to lay His head.

Augustus was the first of a line of emperors that ruled the world for three hundred years. We can read their stories and look at their faces in the part of this book beginning on page 1859. Gathered in great museums in different countries are many deeply interesting memorials of those great, but sometimes wicked, days

—armor, weapons, sculpture, pens (which were called *styli*), inkpots, shoes, keys (for slaves could seldom be trusted), purses and money.

THE CITY THAT WAS BURIED IN A CURTAIN OF LAVA AND ASHES

All these things, and many more, cause us to feel at home with the old Romans. Some of the most wonderful of these things come from the cities of Pompeii and Herculaneum, which were overwhelmed by lava and ashes from Vesuvius in the year 79. So fresh are the colors of the paintings on their walls, so modern their subjects, and so like ours are the cooking implements, that we can scarcely realize how long ago the awful and sudden burial took place. This sealing up by Mother Nature of the city of Pompeii has kept intact for us the very cart-tracks in its streets and the scribbled advertisements on its walls, as well as such matters as the arrangement of houses, baths and theatres.

In Rome itself the temples to the gods and the palaces for the emperors were very numerous. Many of the Roman emperors did something toward beautifying the old city on the seven hills. There is the Arch of Titus, very finely preserved, showing his victory over the Jews and the spoils of the Temple being carried round Rome in triumph. He and his father Vespasian built splendid baths and the Colosseum, which we see on page 3065.

In this vast amphitheatre thousands of spectators sat watching the games and shows that the emperors provided to keep the mob in good temper. Its ruins are among the most impressive and astonishing in the world.

THE GOOD EMPERORS WHO RULED ROME FOR A HUNDRED YEARS

Trajan built the magnificent Forum, with galleries and walls round its open square, and here he set up the column recording his many conquests. This gives the chiseled picture of Trajan's victories over the Dacians—the barbarians across the Danube. The walls of a Roman house have been brought over here and set up in the Metropolitan Museum to help us to realize what the home life of the Romans was like in those long-past times.

For a hundred years after Trajan good emperors ruled in Rome, and there was a time of peace and prosperity.

The work of fine artists makes the

grandeur and brilliance of imperial Rome still live for us; for we can watch them feasting amid showers of roses, or listening to the old Greek stories in gardens by the blue sea. But while the careless luxury was going on, ever round the frontiers of the empire the rough, strong peoples were encroaching and gaining little by little. In the middle of the third century there was defeat on every side. The Goths and the Vandals were terrible foes that could not be driven back, and the empire began to break up.

We know how Constantine favored the Christians, and how he founded a new capital in the East about the year 330, and how in the next century the empire was divided into two, with Constantinople for the capital of the eastern half, and Rome for that of the western.

There was a terrible time when the Goths poured down the peninsula and took Rome itself, in 410. So much damage did these rough people do that to this day we speak of anyone who is careless of beautiful things as a Goth.

HOW THE SPIRIT OF ROME LINGERED ON IN THE WORLD, INFLUENCING NATIONS

But the spirit of Rome lingered on. In the West the barbarian conquerors settled down in Spain, Gaul and Italy, and learned the language and customs and manners of the people of the old Roman provinces; and to the Christian bishops of Rome was given in these countries a leadership which still exists.

In the East a long struggle against Huns and Persians, Arabs and Turks, lasted on, as we know, till the taking of Constantinople, in 1453, made that city the capital of the Turkish Empire and scattered the old learning hoarded there so long.

What a pageant the long story presents to us! Always the tramp of soldiers from first to last, and for centuries we hear the steady sweep of the oars as the prows, with victory aboard, point from end to end of the Great Sea. As we dream again of the early legends, of the grand buildings, the wild revelry, the yells of the storming barbarians, we feel that the sickly perfumes of the extravagant baths and feasts are overpowered by the fine smell of freshly turned earth under the freeman's plow. For we forget the evil, and remember only that figures of heroes are passing by.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 1315.

ANCIENT ROME AS IT IS TODAY



THE STATELY FIGURE OF MINERVA, IN THE VATICAN MUSEUM



THE SPACIOUS RUINS OF THE FORUM IN THE HEART OF ROME



THE FORUM, LOOKING TOWARDS THE RUINS OF THE COLOSSEUM



THE SPLENDID ARCH OF CONSTANTINE STANDING BY THE COLOSSEUM



TRAJAN'S TRIUMPHAL ARCH AT BENEVENTO,
ON THE APPIAN WAY



THE ARCH OF TITUS, SET UP AFTER THE
CONQUEST OF JERUSALEM



A RUINED TEMPLE IN THE FORUM



A FRAGMENT OF THE BATHS OF CARACALLA



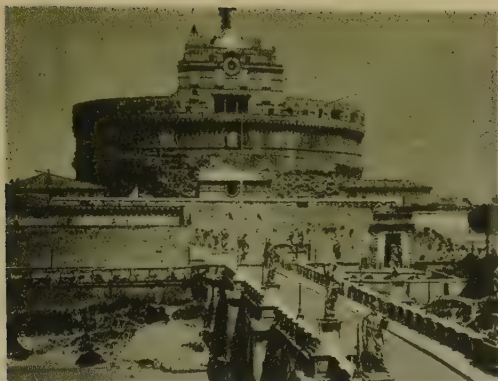
THE APPIAN WAY, OVER WHICH PAUL WALKED TO ROME



THE RUINS ON THE PALATINE HILL AS SEEN FROM THE STREET



THE RUINS OF AN EARLY CHURCH OF THE TIME OF CONSTANTINE



THE OLD CASTLE OF ST. ANGELO ON THE
BANKS OF THE TIBER



THE LOVELY CIRCULAR TEMPLE OF VESTA
AS IT STANDS TODAY



A FRAGMENT FROM A MONUMENT TO TRAJAN IN THE FORUM



THE ARCH OF JANUS, BUILT IN HONOR
OF CONSTANTINE



THE TOMB OF CECILIA METELLA ON THE
APPIAN WAY



THE PANTHEON, THE OLDEST COMPLETE BUILDING IN THE WORLD



TRAJAN'S COLUMN CARVED WITH
TWENTY-FIVE HUNDRED FIGURES



LOOKING OUT ON ROME THROUGH AN
ARCH OF CÆSAR'S PALACE



THE MOST SPECTACULAR RUIN IN ROME—THE COLOSSEUM



THE MASSIVE ARCHES OF THE RUINED
COLOSSEUM



ALL THAT IS LEFT TODAY OF THE TEMPLE
OF THE VESTAL VIRGINS



THE FAMOUS STATUE OF THE DYING GAUL, IN THE MUSEUM ON THE CAPITOL



THE STATUE OF THE WOLF WITH ROMULUS AND REMUS, IN THE MUSEUM ON THE CAPITOL

The photographs in these pages are by Messrs. Alinari, Anderson, Brogi, and McLeish.

The Book of OUR OWN LIFE



The first picture shows a child balanced on a seesaw looking at a toy; the second shows how more blood goes to her brain and her head sinks when she thinks or adds figures.

THE HEART AND WHAT IT DOES

WE find in the bodies of all the higher animals a wonderful pump, which we call the heart. It is of different kinds in different orders of animals, but in all main points the heart of all the animals that have red blood is one and the same.

CONTINUED FROM 939



We know that it beats during life, for we can feel it beating in ourselves if we have been running very hard, or if we are frightened; and if we pick up a kitten or a bird we can feel its heart beating under our fingers. Though as much as this was known for thousands of years, it was not until the seventeenth century that men discovered what the heart really does and how the blood moves. Here we shall consider what it was that William Harvey discovered about the tireless working of the heart.

The microscope in Harvey's time was not very powerful. He could not see the tiny channels by which the blood passes between the large vessels that leave the heart and the large vessels that go back to the heart. He died in 1657, and four years later a great Italian, the fortunate possessor of a new and more powerful microscope, was able to discern in the lungs of the frog the tiny vessels Harvey had to die without seeing, though they

completed the proof of his discovery.

These little vessels are so small that they are almost like hairs, and so they are called *capillaries*, from the Latin word for the hair of the head. The large vessels which leave the heart are called arteries, and those which carry the blood back to it are called veins.

The circulation of the blood, discovered by William Harvey, is a central fact of the body's working, and we must learn to understand it. Let us begin by looking at the heart itself.

The heart is really a pump. Its walls are made of muscle, and it is certainly the most important of all the muscles in the body. Day and night it ceaselessly beats so long as we are alive. If it stops or falters for only a short time, we faint and fall to the ground. Its work is harder in human beings than in other animals, for the part of the body which always most urgently needs blood is the brain. As we stand erect, the brain is above the heart instead of in front of it, so that the blood has to be pumped upward by the heart. Also, the heart has to beat so strongly as to send the blood down our legs with such force that it will come up them again through the veins. It is the warm blood that keeps the feet warm, as they produce very little heat for themselves.

The heart lies in the upper half of the body, which we call the chest; and the chest is bounded by the long, thin bones we call ribs. Some people have a curious way of thinking that the chest is only the front of the body; but, of course, the chest, or box, is in the whole of the upper half of the trunk, and has a back as well as a front. The things that fill it are very simple to remember—a lung on each side and the heart between them.

We usually think of the heart as on the left side of the body, but, as a matter of fact, about one-third of it lies on the right side and two-thirds on the left. If you put your hand on the front of your chest—it is best to use your right hand—then with the tips of your fingers you can usually feel your heart beating, especially if you have been running hard, or are frightened or angry. You feel something coming up and bumping against your fingers about eighty times a minute. From seventy to eighty is the rate in grown-up people; it is rather slower in men than in women. But if you happen to be a small child, your heart beats much more quickly. In a newborn baby it beats about twice every second. When we are feverish it beats more quickly.

If you put the fingers of one hand on your wrist you will feel something beating there, too. This is usually called the pulse.

If, while you have one hand placed on your heart, you put the thumb of the other on the wrist of the first hand, you will find that the number of beats in both cases is the same; but you will also notice that the beat at the wrist always comes a very short time after the beat of the heart. It is the beating of the heart that makes the pulse, for it means that the heart is sending a wave of blood through the arteries. As the blood takes a little time to travel, the beat at the wrist must be a little later than the beat at the heart itself.

We usually call the pulse at the wrist *the* pulse, but every time the heart beats it sends the blood through all the arteries, and there are several other places where we can notice a pulse. You may find for yourself one pulse which we have all noticed, though perhaps we did not know what it meant. If you cross your legs and

watch the crossed foot, you will see that it gives a little jerk up and down. If at the same time you feel the pulse at your wrist, you will find that the two rates are the same, but your foot always jerks a little later than the wrist pulse.

That little kick is due to the fact that the great artery of the leg runs down the middle of the back of the knee in a beautifully protected fashion. When you cross your legs, you press the artery against the hard bone of the other knee, so that every time the artery swells with the pulse of blood in it the leg gives a little kick.

Now let us consider the veins themselves. These are tubes very like the arteries, but much thinner, for the pressure of blood inside them is not nearly so high as in the arteries. Many of the veins lie on the surface of the body just under the skin, so that we can see them.

As we have said, the blood in them is running back to the heart. There is no pulse in the veins. Before the blood has reached them it has passed through the tiny tubes which are the communication between arteries and veins, and there the pulse gets less noticeable. Therefore the blood flows upward quite evenly through the veins.



Where the heart is.

The time may come to any one of us when there is an accident to ourselves or to someone else. An artery or a vein is cut, and the person bleeds. Now, the blood is very precious, and no one can afford to lose it. Therefore our duty is to stop bleeding whenever we see it. It may happen that anyone who has a little bravery and a little knowledge may save a life in this way. Here are the rules.

The first does not depend on any knowledge of the circulation, and is as simple as can be. Let us suppose a stone has been thrown and someone's face has been cut. There is a handkerchief at hand, of course, and when that is dabbed on and taken away you can usually see some point where the blood is oozing out. Now the rule is to put your finger on that point, and to keep it there. Once your finger is put on, there is no danger and everyone has time to think. A doctor can be brought or the wounded person can go to a doctor; but the first rule is to keep your finger on the point from which the blood is oozing.

The other rules depend on our knowledge of the circulation of the blood. Let us take a common instance. There are quite large veins on the surface of the leg, and sometimes they get stretched and swollen and weak. One of them may even give way altogether, and the blood may begin to ooze through the skin. Where there is no help at hand, a person may bleed to death in consequence of this little accident. Of course, anyone who knew the rule about putting the finger on the bleeding-point, and who kept his head, would always save himself; but then most people do not learn these little rules. They are so busy learning names of kings or battles or the number of wives Henry VIII killed, that they have not much time to learn how to save lives.

But when that rule has been followed, what else can be done? What we do will depend on our knowledge of the circulation. The blood in this broken vein in the leg is flowing up toward the heart. Therefore, we must apply pressure, let us say, with a handkerchief below the bleeding-point.

Veins have valves in them, which are so arranged as to prevent the blood from flowing back through them; but it is sometimes necessary to apply the pressure both above and below the bleeding-point, for sometimes the valves give way. Also, the valves in our veins are not arranged in the best way for a creature walking erect; they are ar-

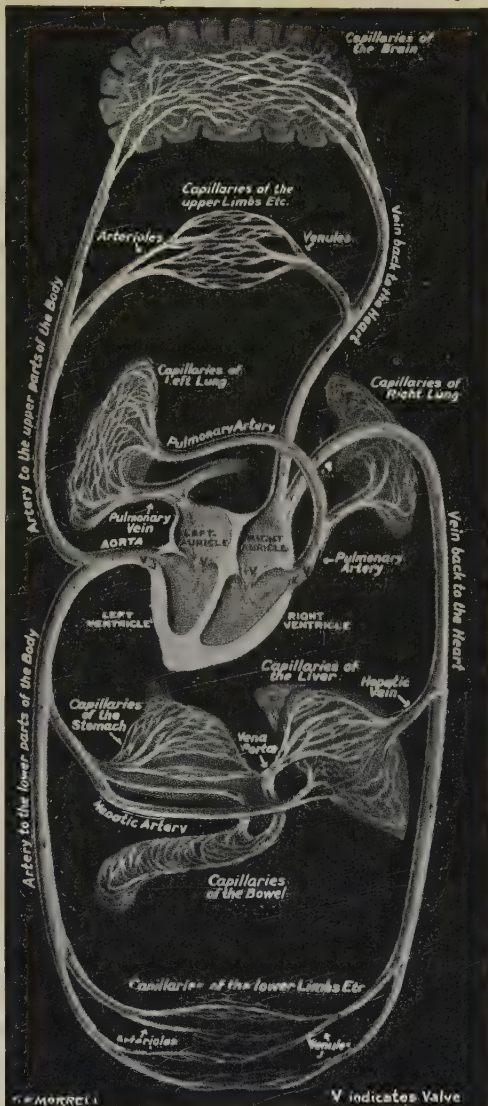
ranged in the way that would be best for a creature walking on all its four limbs. That is very interesting.

But now let us suppose that there has been an accident, and someone is bleeding in a different way. Let us suppose that the blood is brighter, and that instead of oozing out, it comes in jets or spurts. This means that an artery is bleeding, and though in any case we put our finger on the bleeding-point, the next thing to be done is different; for the blood is coming from the centre, and not going back toward it, so we must apply our bandage above the bleeding-point, on the side nearest the heart.

Now let us look at the heart and see exactly how it does its work. What we call the circulation of the blood is really two circulations, and the two circles meet in the heart. There is, of course, only one continuous stream; but as the blood passes along this stream it really goes through two circles, one large and one small. There is the circulation through the lungs, the use of which we know, and there is the circulation through the body, the use of which we also know.

The heart, then, is really two pumps. It has a left side and a right; the left side gets the pure blood from the lungs and sends it to the body; the right side gets the impure blood from the body and sends it to the lungs.

The two sides are made on the same principle, and each consists of two chambers. The upper one, which is the



How the blood circulates through the body.
View from the back.

smaller, is called an *auricle*. It receives the blood and then drives it into the lower chamber, which is much larger and stronger. The auricle has only thin walls, for its work is not hard—it has only to send the blood a very short distance through the valves.

But the *ventricles*, as the larger chambers on each side are called, are different. The right ventricle has to send the impure blood, which the right auricle has received from the body, to the lungs; and as this needs a good deal of force, the right ventricle has a fairly thick muscular coat. But the left ventricle has to send its blood through the entire body—brain and toes and all—and so its walls are exceedingly thick, and its power is tremendous. It is much the bulkiest part of the heart, and the tip of the heart, which you feel when you put your finger on your chest, is the tip of the left ventricle.

THE WAY IN WHICH A DROP OF BLOOD FLOWS THROUGH YOUR VEINS

Let us imagine that we could watch it, and let us take a drop of pure blood that has entered the left auricle. The auricle squeezes it, like a fist squeezing something in it, and drives it into the left ventricle. When the ventricle is stretched and full, it replies by squeezing in the same way, and drives the blood through the largest artery in the body, called the aorta, so that it goes to nourish every part.

Perhaps the drop of blood we are watching stays in the aorta until the openings of many of the first branches of it are passed, and runs down the branch which goes to the left leg, nourishes the life of the cells at the base of a toe-nail, and then begins its long journey back through the veins.

But now, of course, it is dark and impure. It does not go straight to the lungs, for the force with which it was sent from the heart is now nearly exhausted. It goes back to the heart itself and so completes the larger circle of the circulation. It passes up in a great vein which opens into the right auricle. When the auricle is full, it contracts and beats and sends the blood into the right ventricle. This contracts in its turn and sends the blood to the lungs. It comes back from the lungs pure and bright, by vessels which open into the left auricle—and that is where we began. We see, then, how the circulation consists of two circles joined together at the heart.

We must not suppose that all the purifying of the blood is done in the lungs. Many waste matters are filtered out of it as it passes through the skin and the kidneys; also, as it passes through the body it gets fresh food material, so that the blood which comes back to the right auricle from the body is in some respects better than the blood which left the left ventricle. But it is much worse in respect to its gases, and that is why it has to be sent to the lungs.

THE LITTLE NERVE-CELLS THAT START THE HEART'S BEAT

In asking ourselves how and why the heart is made to beat, we must think of it as a great muscle, very complicated, and very different from any other muscle in the body, but still a muscle. Now, muscles are not masters, but servants; they are made of living cells which contract; but they never contract of themselves. Every kind of muscular tissue in the body is the servant of nerves, and does what it is told. It contracts only when a nerve orders it to do so.

We find in the heart a large number of nerve-cells, and it is these that really start the heart's beat. They are very sensitive and are quickly affected by almost every possible influence. Heat affects them very much, and the heart beats more quickly when we are hot; then all sorts of strange things in the blood affect them, such as alcohol, the gases which enter the blood when a man smokes, and many other poisons. Some make the heart beat more quickly, some more slowly, and smoking may often make it beat irregularly.

The nervous government of the heart and its beating is very wonderful. After all, the whole of the body really exists for the sake of the brain, and if the brain could not control the heart, things would soon go wrong. For instance, the work required to send enough blood to the brain when we are standing upright is harder than when we are lying flat. It is therefore necessary that the heart should beat more quickly when we stand or sit than when we lie, and so it does. But this can be done only through the brain's giving orders.

THE TWO SETS OF NERVES THAT RUN FROM THE BRAIN TO THE HEART

So we find that two sets of nerves run from the brain to the heart. For convenience we may call them two nerves.

These control the nerve-cells that belong to the heart itself. When an order is sent down through one of these nerves, the heart beats more strongly and quickly; when an order is sent down through the other, it beats less strongly and less quickly. From moment to moment, throughout the whole of our lives, the brain is thus able to control the beating of the heart. We know the exact position of the cells that do this work.

There is another important fact about the circulation which teaches us how marvelously the brain controls the body. If we examine the wall of an artery we find it beautifully and wonderfully made.

It has a firm outer coat and a smooth inner coat; and between these two there are a great many elastic fibres, so that the artery can be stretched when the heart sends a pulse of blood through it, and can then spring back to its former size. But there is also a great quantity of muscular tissue in the wall of every artery. Every fibre of this muscular tissue in the arteries of the body is governed by nerves, and acts on the orders which nerves send; and all these nerves spring from, and carry messages from, a small group of cells in the brain lying quite close to the cells that govern the heart.

HOW THE BRAIN REGULATES THE SUPPLY OF BLOOD TO THE BODY

Now, the extent to which the muscular tissue of an artery is contracted decides its size, and this decides the quantity of blood that will go to the part which the artery supplies; there is not a single part of the body that has not its supply of blood regulated by the brain. When we examine further, we find that, as in the case of the heart, there are two sets of nerves: one to carry messages ordering the blood-vessels to contract, the other to carry messages ordering them to relax.

In almost every part of the body these changes are going on as they are needed. Usually a message is sent by the part of the body in question up to the brain—perhaps a message for more blood, and perhaps a message for less blood. When we go out on a very cold day, the nose needs a large quantity of blood in order to warm the cold air that passes through it on its way to the lungs. It sends a message to the brain, and the blood-vessels in the lining of the nose are all ordered to relax, so that large quantities of warm blood rush quickly through the

nose and warm the air we breathe. Sometimes the message may be of a different kind, and perhaps it may be impossible to see its use.

What we must remember is that, though the body is a machine, it is a living machine, alive and under the command of life. We can hardly think of anything more wonderful than the circulation of the blood with its power of adapting itself to every need of the body.

AN EXPERIMENT TO PROVE WHAT HAPPENS WHEN WE THINK

When we think, the brain requires more blood. Suppose we take a child and lay her flat on a delicately balanced table, and place her so that the table lies quite flat and is not tilted up at either end. Then, when we have got this right, let us give her a difficult problem to do in her head. No sooner has she begun to work it out than the end of the table where her head is begins to fall. The reason is that the blood has become heavier and weighs down that end of the table.

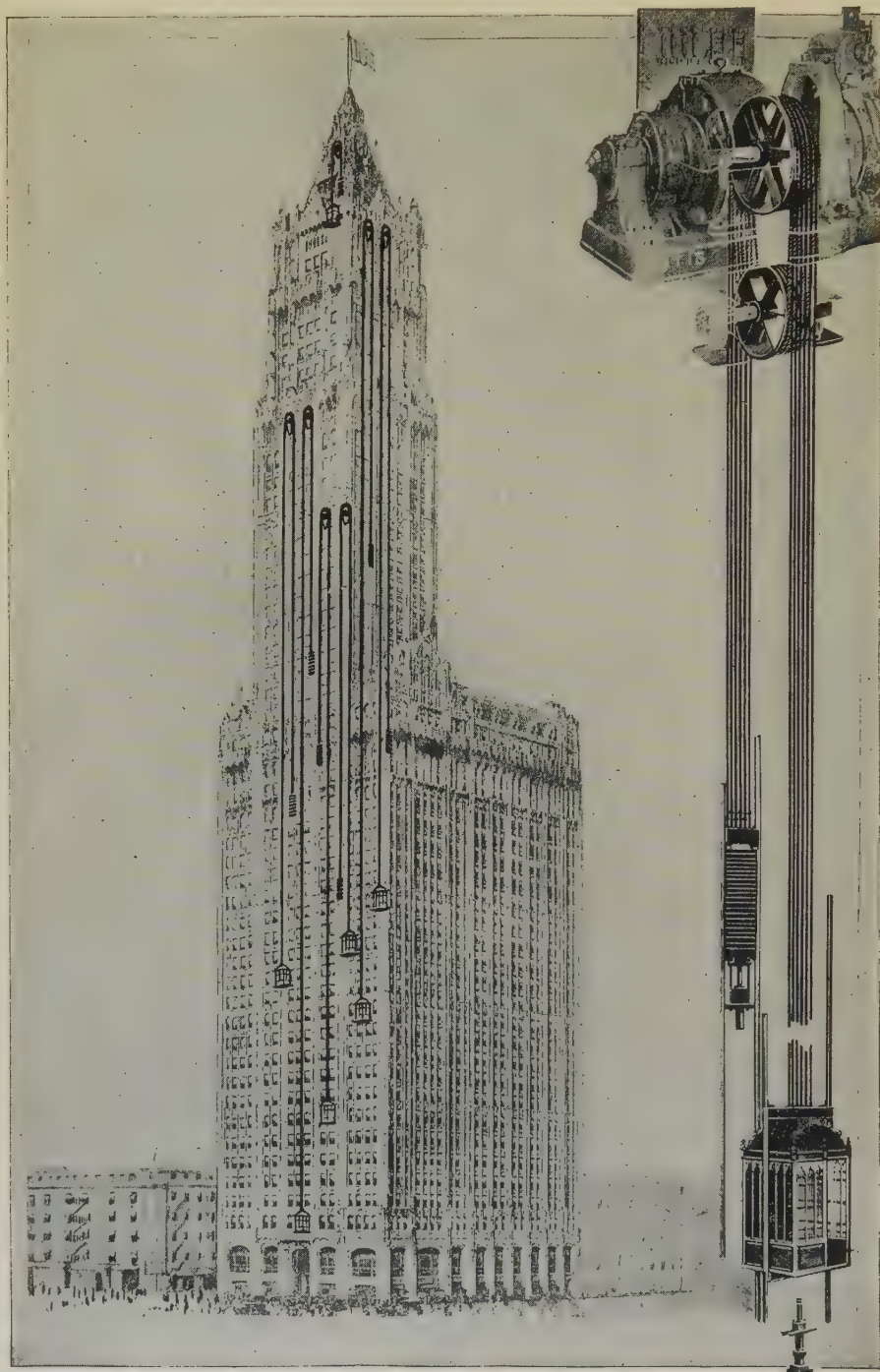
There is one other thing we must understand about the circulation. We have the idea of the blood streaming round in a system of closed tubes; but if the walls of the tubes let nothing through them the circulation would be of no use. We have already learned that they let gases through. The arteries themselves are too thick for this, and so are the veins. It is the tiny tubes, or capillaries, consisting of only a single layer of very thin cells, that allow gases to pass in and out.

THE WASTE OF THE BODY THAT GOES AWAY THROUGH LITTLE TUBES

That is what happens to the lungs. But throughout all the rest of the body, while carbon dioxide is passing inward through the capillaries from the tissues, all sorts of food supplies are soaking out through the walls of the capillaries into the tissues for them to live on. All sorts of poisonous things which the tissues have been making soak back into the capillaries, and are carried through the veins to the heart. But the opposite happens when the blood visits the kidneys, for thousands of capillaries in the kidneys are specially arranged close to little tubes lined with special cells that have the power of picking out all these waste products from the blood, and so getting rid of them.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 1325.

ELEVATORS IN A HIGH BUILDING



This shows the elevators which run in the tower of the Woolworth Building in New York City. Since the number of people on the top floors is not large, not all elevators run to the top. The small elevator highest up carries people from the top floor to the platform near the top of the tower. There are twenty-seven elevators in this building. Some buildings have even more.

The Book of Familiar Things

WHAT THIS STORY TELLS US

NO invention of our day means more to people who live in cities than the high-speed elevator. Without it our large cities would not be possible. If all the people who now live and work in large cities were forced to occupy buildings so low that the stairs could be climbed easily, the cities would necessarily be spread out over enormous spaces. Offices and homes would be so far apart that men could not do business as they do to-day. The modern elevator carries us swiftly, safely, and almost noiselessly, up and down, ten, twenty or thirty stories. We tell you in this story how the ordinary electric elevator works, and show you also a very common elevator which is worked by the power of water. Both are safe and swift. When you have read this story, you will be able to tell them apart and to understand the machinery which moves them.

HOW ELEVATORS GO UP AND DOWN

THOSE of you who live in a large city take the tall buildings—ten, twenty, thirty, or even more stories high, as a matter of course. If you live in the country or in a small town and have never seen the buildings themselves, you have seen pictures of them, and may have wondered how people can be found to fill them.

You have already been told in our book of the method of building, that the framework is of steel and supports the walls. Without this kind of construction such buildings would not be built at all. If the whole of the great weight rested upon the walls, it would be necessary to make them so thick at the bottom that most of the lower stories would be a mass of stone, without any room for offices or shops. The walls could be made thinner toward the top, of course, but much space would be wasted.

But even when these high buildings are built, they could not be used but for another modern invention. In some of them thousands of men and women work, the population of a town sometimes. How do they get to their offices so high up in the air? Only very strong and very active persons could climb twenty flights of stairs several times a day.

Go into one of these buildings and you will see, behind iron or glass doors,

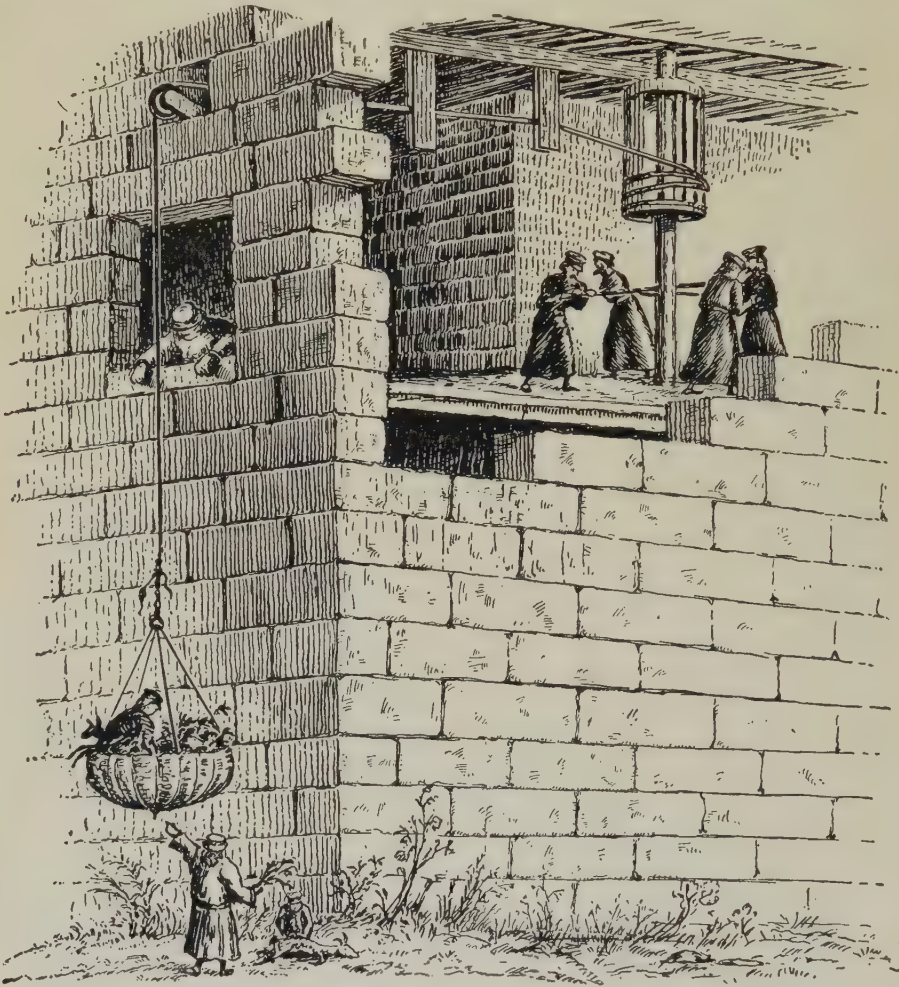
CONTINUED FROM 1067

one, two, a dozen, or perhaps more elevators, depending upon the size and height of the building. A door is slid back, and you step into the car with other people, sometimes twenty or more; the door slides shut, a lever is pushed, and up you go like an arrow. You are carried straight up, the length of a city block, in much less time than it would take you to walk that distance on the pavement. The doors are opened, you step out, and the car goes on, or else returns to the first floor.

Such is the modern high-speed electric elevator. But it was not always like this. From very early times men have felt the need of some sort of machine to lift themselves or goods. In our first picture you see an early form of lifting machine. During the Middle Ages, as you have been told, there was little law and order in the world. The motto of the time was: "Let him get who hath the power, and let him keep who can." Robbery was a common profession then. Here you see a corner of an old monastery which had no entrance on the level of the ground. Provisions and visitors were hoisted in the basket. Elevators of this sort are still in use, though not often to raise passengers. The bucket and windlass at the well really make a sort of elevator, though we do not think of them as such.

After the steam engine was invented, elevators were raised by winding the rope upon a cylinder. You may have seen one working upon this principle, loading or unloading a boat, raising dirt from the foundation of a house, or lifting building material high in the air. Though they

many of them are in use at the present time. One type is the plunger elevator, which is one of the safest kinds. A strong iron pipe is sunk into the ground as deep as the building is high. A strong iron cylinder, which fits tightly, but smoothly, is placed in the large pipe, and



This picture was drawn from an old print which showed how some monks in an old monastery got in or out of their home. There was no entrance on the ground floor for fear of robbers, but monks, visitors and provisions were hoisted up to the opening above. Of course the wall nearest us was solid.

have no car, they work in the same way. These were not very satisfactory, for one man had to be employed to run the engine and another to look after the car.

THE POWER OF WATER IS USED TO RUN ELEVATORS

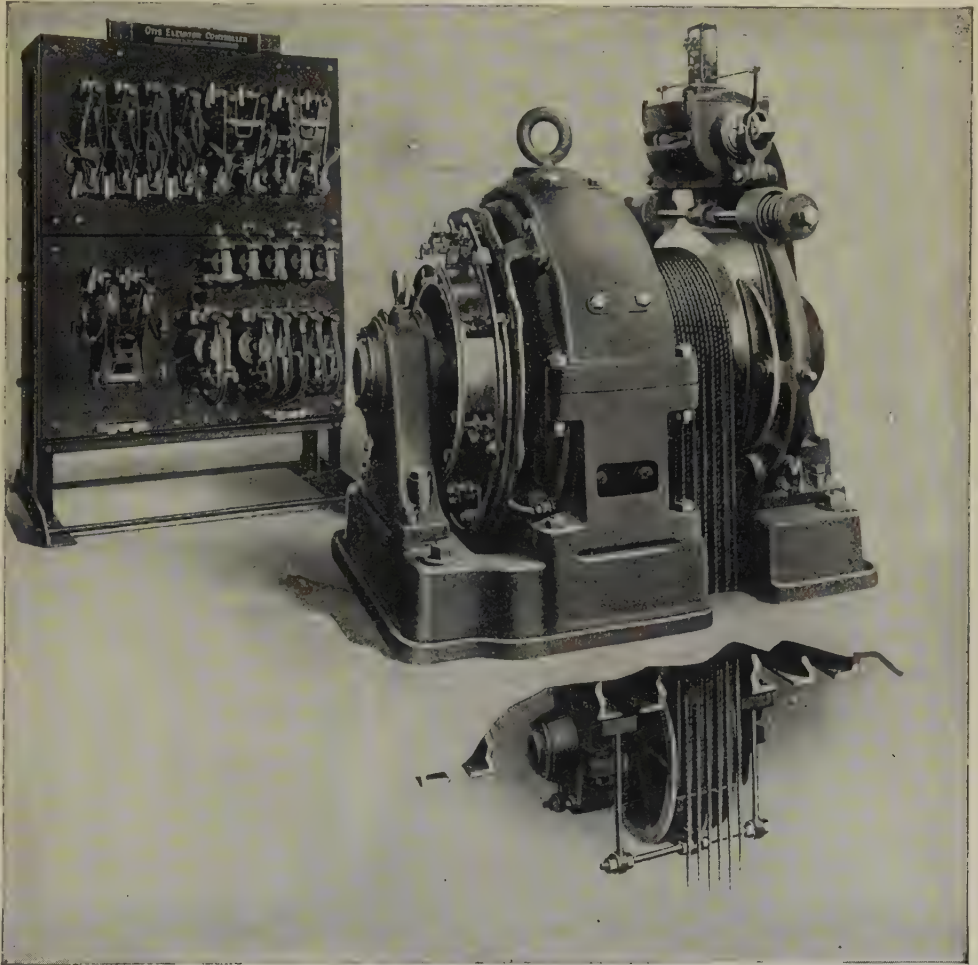
Men had learned the power of water by this time, and we soon see that use was made of it to lift passengers. The hydraulic elevator was soon improved, and

the car is fastened on the top. In the pipe are two openings, one to let water in, the other to let it out. Now, if water, which has been compressed by a powerful pump, is let into the pipe, it will force up cylinder, car and passengers. When the car has gone as high as is desired, the water is cut off and the car ceases to rise. When the operator wishes to descend, he opens the outlet pipe, and

HOW ELEVATORS GO UP AND DOWN

as the water escapes, the car sinks. All this is done from the car itself. You will see elevators of this kind in many buildings which are not very tall, such as department stores. They are very safe, for they cannot fall unless the pipe should burst; even then, the water could

rather hard to describe, but perhaps you can understand if you study the picture carefully. In all of these cars you will notice heavy weights hung in the shafts outside the cars. These are made to weigh almost the same as the cars, so that they would almost balance if the



This is the motor, the sheave and the brake which controls an electric elevator. The motor on the left turns the sheave in either direction as the operator decides. The brake helps to check the car, and the wire ropes support it. The idler sheave, around which the ropes run, is underneath the floor. The switchboard behind, controls all the elevators in the building.

Pictures, courtesy of the Otis Elevator Company.

not escape very rapidly. When the pipe does not go through rock it is often surrounded by cement.

There is another type of hydraulic elevator which is more used than this. It has a cylinder and a plunger, too, but the plunger is connected with the wheels over which the rope goes, and is so arranged that when it moves a few feet it makes the car move many feet. It is

cars were let loose. The power, then, no matter what it is, has only to lift the load, and not the heavy weight of the car.

ELECTRICITY NOW USED MORE THAN ANYTHING ELSE

Most elevators nowadays are run by electricity, and are of two kinds. One has a drum, or windlass, which is run by an electric motor. The rope which lifts the car is wound around this drum. This

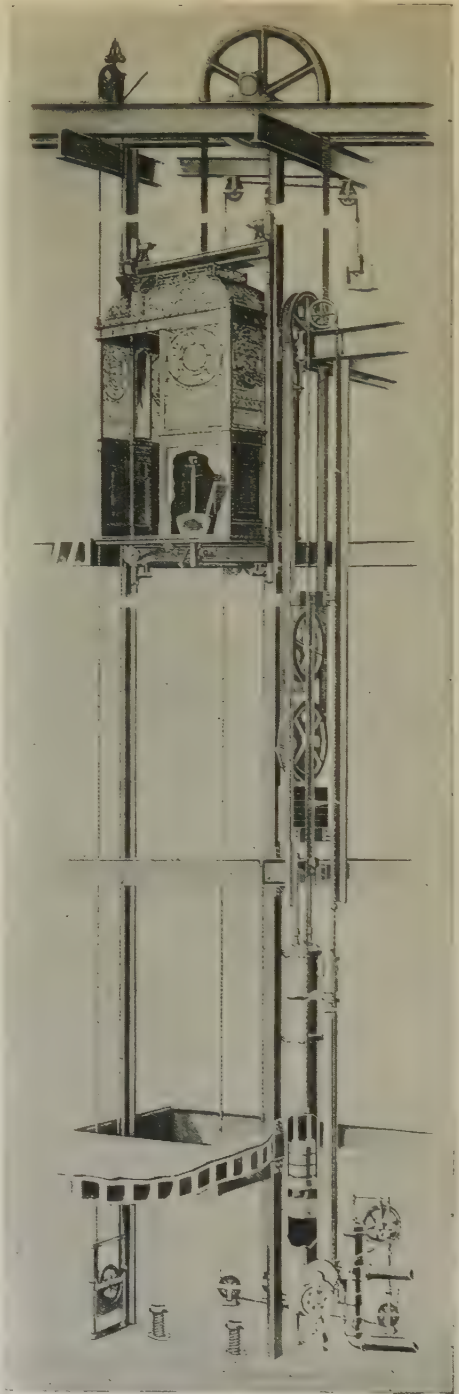
kind cannot be used very well in a very high building, for the machinery would take a great deal of room.

Therefore, advantage has been taken of the fact of friction. The rope is run over a pulley, called a "sheave," then over another and then over the first again, making a complete loop. A rope wound like this cannot slip, for the greater the weight, the tighter the rope clings. One end of the rope is attached to the car and the other to the counterweight. The electric motor turns the sheave, and the rope passing over this and the second, or "idler sheave," raises the car. The motor will turn the sheave just as rapidly in the opposite direction. The brake is on the other side of the main sheave. A switch in the car enables the elevator man to go up or down, slowly or rapidly, or to stop at once.

WHAT WOULD HAPPEN IF THE ROPE BROKE?

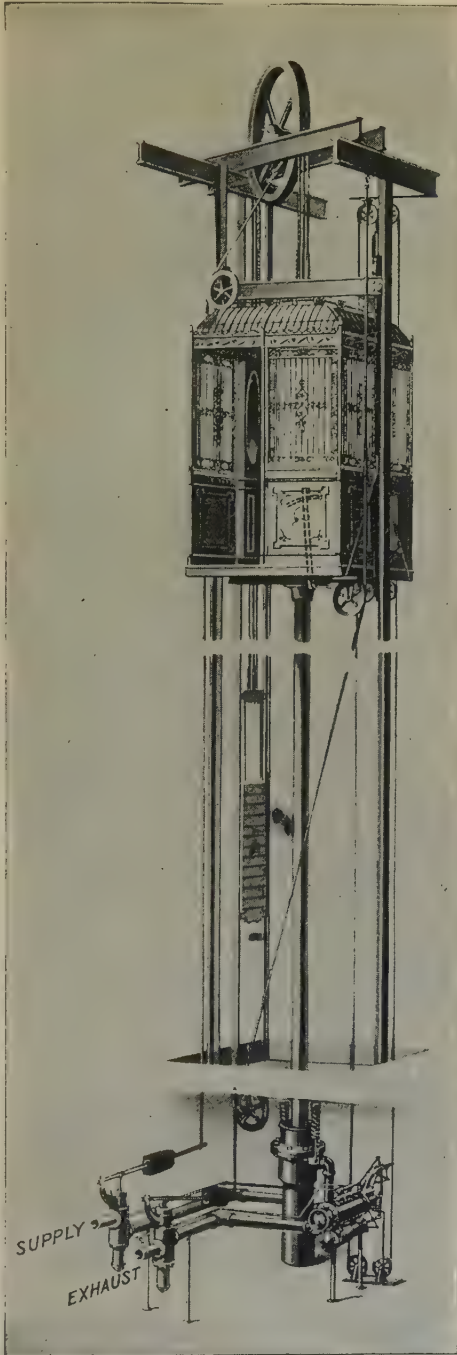
What if one of these cars should fall? This does not often happen. In the first place, though one wire rope is enough to sustain the weight, very often as many as six are used. It is almost impossible that all of them should break at once. Then, too, the brakes are set to hold the car if the power is cut off. There are still other things which help to make the car safe. On the bottom of the car are powerful steel jaws, which catch the rails between which the car runs if it begins to run too fast. These devices would seem to be almost enough, but the makers of elevators have invented something else. At the bottom of the shaft are two oil-cushion buffers. If the car should strike them, the oil would be forced slowly into other chambers, and the shock would be broken, just as when you jump upon a feather bed. Sometimes the bottom of the shaft is made very tight, and the car fits closely. Then if the car comes down rapidly, the air cannot get out, but is gradually compressed and pushes back against the bottom of the car. Once a test was made to see what would happen. Everything which would stop the car was removed and it was allowed to fall. It dropped like lightning at first, but as it drew near the bottom it began to go more and more slowly, until finally it reached the bottom without breaking a single one of a basket of eggs which had been left on the bottom of the car.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 1305.

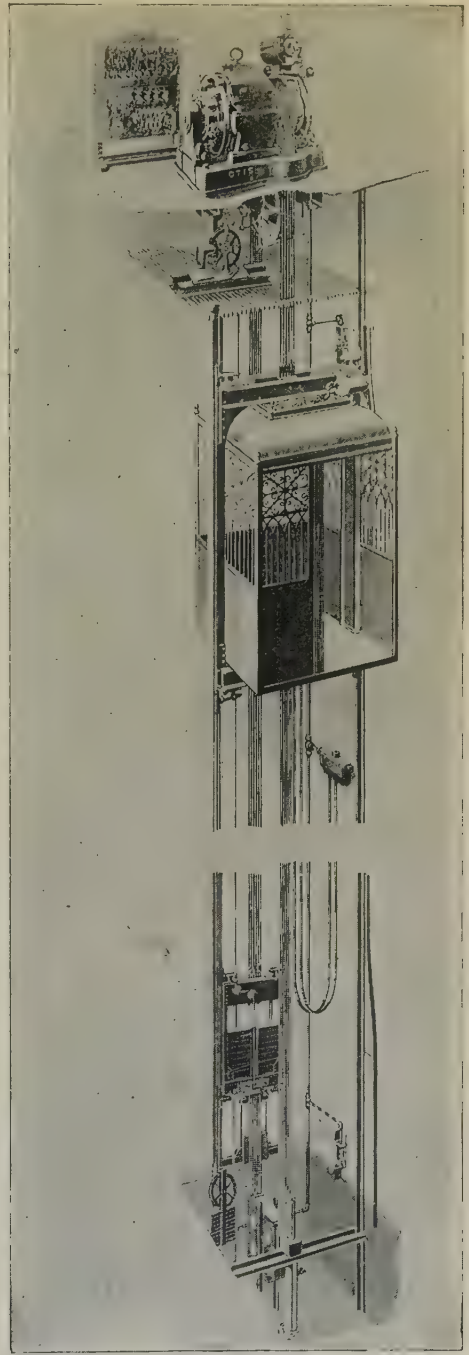


This is a common type of hydraulic elevator. The piston, or plunger, works in the tank of water, and as it is pushed out or drawn in, raises or lowers the car. A part of the side of the tank is removed so that you can see the piston. The rope is run several times around the pulleys, so that when they move one foot the car moves several.

TWO TYPES OF PASSENGER ELEVATORS



This hydraulic elevator is pushed up by the pressure of water forced into the pipe in which the plunger at the bottom slides. When the water is allowed to run out, the car descends. The pipe must be as far in the ground as the building is high. The break across the machinery means that we cannot show the whole height.



The high-speed electric elevator is run by the tiny electric motor at the top, which turns the sheaves in either direction, or stops, according to the position of the tiny switch in the car. The distance from bottom to top of an elevator shaft may be several hundred feet. We show you here only the top and the bottom.

A VISION PAINTED IN FLANDERS



Photo, courtesy Metropolitan Museum of Art.

THE ANNUNCIATION, BY ROGER VAN DER WEYDEN

1220

The Story of THE FINE ARTS



Christ in the Manger. By Hugo van der Goes.

THE ARTISTS OF FLANDERS

ONE of the most delightful chapters in the history of medieval Europe is that telling of the interest taken by royal and other rich people in architecture, sculpture and painting. Thus art developed under patrons.

There are in the museums of Europe, as well as in many private collections, treasures of these early days in the form of illuminated missals, Bibles, Books of the Psalms and other devotional volumes done by artists at the order of men who could afford to pay them for their labors. The English, Flemish and French manuscripts are foremost in artistic merit. Some good examples in color were reproduced on page 477 of this book.

France was particularly fortunate in her rulers in the fourteenth century. Charles V and his son, the Duc du Berry, showed an intense enthusiasm for art and scholarship; and to work for them Flemish artists came to Paris and established, with the French painters, a kind of school there.

To this period belongs a charming array of illuminated manuscripts containing miniatures, initials and border-designs which to this day keep their wonderful quality. Outstanding among these is the rich and exquisite Book of Hours of the Duc du Berry, illuminated by Pol de Limbourg and his

CONTINUED FROM III2



brothers. A few years later a French artist, the famous Fouquet, painted about forty miniatures for a Book of Hours for Etienne Chevalier.

Beautiful work was being done in the meantime by the English illuminators, the best belonging to an earlier period than that of the Hours of the Duc du Berry. Generally speaking, the fourteenth and early fifteenth centuries saw the end of the finest of the illuminators in both England and France.

The invention of the printing-press naturally brought this fascinating branch of the arts to an end, and one of the reasons why the lovely books shown in the British Museum and other collections are so precious now is that they belong to a period whose activities can never be brought back again. Painting and sculpture and architecture advance and decline and advance again; but the day of illuminated manuscripts is forever passed.

The decoration of such rare volumes was one form of Flemish art expression. And Flemish art grew out of that same Gothic movement which had stirred the Sienese to paint their mystical saints and Madonnas.

Although we have been accustomed to think of Italy as the first home of men of genius in painting, we must not

forget that at the same period the Low Countries were producing artists who were their rivals.

It would seem that the Venetians were destined to achieve an immediate immortality; the Flemish artists are still, after five hundred years, waiting to be given the place of honor that is rightly theirs. There are certain critics who place the early Flemish before the Italians, others who give them a different judgment. For ourselves, we have learned the story of Italian painting, and that is a great help in giving us a standard to work by. Then we must remember that artists were a traveling community, and many of the Florentines and Venetians had seen the Flemish at work and been influenced by them, just as the Low Countries had been moved by the art of Italy, so that the two great schools of Renaissance art were in practice more nearly alike than one would think.

But perhaps we ought to realize most of all that racial temperament separates the Italian from the Flemish to such an extent that their work ought to be more contrasted than compared.

THE VIGOR OF THE FLEMINGS AND THE IMAGINATION OF THE VENETIANS

The Flemish, fixed firmly in their domain of strength and truth, never had the soaring imagination of the Italians. In the art of the southern country there is always a note of the ideal; you never know when genius is going to take wing and fly above your head. In the Flemish, uninteresting everyday events and persons are made superbly great; genius sits firmly on a bench by the wall and is very content with things as they are.

Then, too, there were the differences caused by climate and life in different towns. Venetian painters lived, riotously happy, in a city that was caught in a silver mesh between a radiant sky and a radiant sea. The Flemish, breathing their colder air, were more settled in fixed thoughts, and had a more frugal and commercial habit of life. They were a race of weavers, with a passionate love for the textures of silk and cloth.

When we think of their greatest expressions of art we think of men and women heavily clothed, generally in dark material, from whose rich gloom emerged a face and hands. There is no need for laborious composition. The person is the picture and the picture contains some-

thing immeasurably great because it holds the essence of humanity, the humanity that labors and contrives and is fixed to the soil.

The picture may be merely a man—a merchant—and a woman, his wife; but they are still and timeless and eternal, like the Pharaohs of Egypt who sit, carved in stone, looking out across the level sands.

TWO BROTHERS WHO STARTLED THE WORLD BY THEIR WORK

The first men who stamped the school of Flanders with this peculiar quality were the Van Eycks, two brothers, painters in Bruges. To Hubert the elder, who lived from 1366 to 1426, belongs the greater share of a piece of work which had a tremendous effect on the artists of the day. This was an altar-piece called *The Adoration of the Lamb*, painted for a church in Ghent. By studying the various panels, probably planned and perhaps painted by Hubert, we may find in them the whole difference between the religious paintings of Flanders and Italy. The composition may not be so triumphant as much of that marking the southern schools, but we can see from the technique and character of the work that the brother-artists had no equals in that realm of painting. The panels of this altar-piece are now scattered among Ghent, Brussels and Berlin.

Tradition says that oil painting was invented by the Van Eycks. This medium was probably discovered before their day, but they perfected its use and learned many secrets of treatment and clear color which artists for hundreds of years have envied.

There is something statuesque and superb in Hubert van Eyck's angels and saints; they are reposeful, quiet people, the women grave and sweet, the draperies painted in the ringing tones that mark the Flemish school. The share of Jan van Eyck (1387-1440) in this work is uncertain, but as he was above all a portrait-painter, it is probable that the pictures of the donors, in this splendid altar-piece, are his.

THE MAN WHO WAS THE GREATEST PORTRAIT-PAINTER IN EUROPE

Jan van Eyck, indeed, stands out as the greatest portrait-painter of Europe and the chief glory of the Flemish school. When he painted saints and Madonnas he showed quite clearly that he was

FAMOUS PICTURES OF THE FLEMINGS



The Virgin and Child,
by Van der Weyden.



The Adoration of the Shepherds,
by Van der Goes.



The Virgin and Child,
by Quentin Matsys.



The Adoration of the Lamb, by Hubert van Eyck.



Portrait by Jan van Eyck.



St. Cecilia, by Van der Goes.



Bishop Gardiner, by Matsys.

PORTRAITS AND RELIGIOUS PAINTINGS



Princess Elizabeth of Austria, by François Clouet.



Hans Memling's picture of the Virgin and Child.



The Adoration of the Child, by Gerard David.

bored; when he made portraits of ordinary men and women his power rose to a superb height.

But he was a portrait-painter first of all. He was not concerned with idealism or philosophy. He did not show in a person's face the inner meaning of the character, as Léonardo da Vinci did; he was content with the face as it was, mirroring the thoughts and impulses which had stamped it. To this genius of insight he added genius of technique, and the result is a series of portraits which now, six hundred years later, hold us enthralled.

Of the many remarkable pictures painted by Jan van Eyck three portrait groups stand out: The merchant and his wife, in the National Gallery, London—one of the chief glories of that collection; the picture of Canon van de Paelen, and the portrait of the artist's wife, both at Bruges. New York and Philadelphia possess notable examples of this old master's painting.

THE PAINTERS WHO PUT SADNESS IN THEIR PICTURES

Roger van der Weyden, who was born in 1400, was also an artist of Bruges; and though he shared their skill in technique, he was of a different cast from the Van Eycks. He was filled with visionary and mystic thoughts, and had a love for sad subjects and tragic places. The Descent from the Cross, in the Escorial in Spain, is a picture of beautiful sorrow. Philip le Bon, of the house of Valois, whom he painted, may have had some very happy hours, but Van der Weyden drew the prince with a face of pathetic endurance—as of a man with an anxious mind, who had to work very hard. In the Metropolitan Museum in New York there are several interesting paintings by Van der Weyden.

Thierry, or Dierick, Bouts (1410-1475), a man of Haarlem who followed the Van Eycks and later worked under Van der Weyden, was another artist who had a leaning toward painting unhappy-looking people. But in his case it is not because he is filled, like Van der Weyden, with the northern mysticism which saw the glory of suffering as greater than the happiness of the saints, but because he had a passion for drawing the harder side of life. He could not bear to gloss over or idealize any subject, and his treatment of color matched his crude vigor of drawing.

A little graciousness and gentleness, and a sense of beauty in composition, might have made of Bouts a great artist. His best pictures are *The Meeting of Abraham and Melchisedec*, in Munich, and *The Judgment of the Emperor Otto*, in Brussels.

The Flemish school rose to great heights in the latter half of the fifteenth century. Among a number of less important names three or four stand out—Memling, Van der Goes, Gerard David, Quentin Matsys.

ALL THE FEELING OF MEDIEVAL EUROPE IN ONE MAN'S PICTURES

Memling, who lived from about 1430 to 1494, sometimes called the Raphael of Flemish art, is one of the most famous names in the early story of the Low Countries. He was a portrait-painter second only to Jan van Eyck. Although he was not quite so great a master in delineating features as was Van Eyck, he had a touch of imagination and romance that the other lacked. Also, he was free from the brutal realism of men like Bouts.

Memling painted a number of beautiful religious pictures and portraits. There is all the feeling of medieval Europe in his painting *The Arrival of St. Ursula at Cologne*, in the Hospital of St. John at Bruges, and it is also a piece of perfect composition. This is one of fourteen scenes giving the story of St. Ursula, painted on a shrine shaped like a Gothic chapel (see page 1993). Many other interesting works of Memling are at Bruges; but his pictures were bought in Italy, England, France and Spain.

Memling was not really sensitive to sacred subjects—only Van der Weyden, in this group of Flemish artists, was naturally a religious painter—but he rendered them with a kind of exquisite gentleness added to his strength of workmanship. The pictures of Christ being nailed to the Cross, and Christ being put into the tomb, are wonderful examples of his skill. To get the essence of Memling's genius we should study his portraits. Some of them are pictures to which, as to Jan van Eyck's, we return again and again, captivated by their poise, their calm and serene dignity.

We need not go to Europe to see Memling's pictures, as there are some fine portraits and religious paintings by him on our own continent, both in public museums and in private collections.

ONE OF THE LOVABLE QUALITIES
IN PICTURES OF FLEMISH WOMEN

Hugo van der Goes (about 1435 to 1482) was another painter of beautiful religious subjects. In his picture of St. Magdalen and St. Margaret we have a composition in which solemn and gracious figures stand out before a background of winding roads, hills and trees. The women's faces, long and narrow, with

Gerard David. It balanced the tendency to study and imitate the Italian painters which began to creep into Flemish art about this time. In the paintings of Matsys the human figure held great importance. His best known work is *The Descent from the Cross* at Antwerp. In the Metropolitan Museum, New York, you may see his *Adoration of the Kings*.

Gerard David's most famous picture is



CHILDREN PLAYING, BY PIETER BRUEGHEL

every hair brushed back from their clear brows, have the sweet gravity which is one of the lovable qualities in Flemish portraiture of women.

Van der Goes's most famous picture is a huge *Nativity*, now in the Academy of Florence. In it angels and birds and beasts, and St. Joseph and the Madonna, robed in heavy Flemish material, are grouped round about the tiny Bambino.

The influence of the Van Eycks is seen in the work of Quentin Matsys and

The Virgin and Saints, in the Rouen Museum. A very different painting from this group of calm and worshiping women is his picture of *The Prisoner and the Wicked Judge*, at Bruges. Here we see a number of men surrounding a table where an unfortunate prisoner is stretched undergoing torment. Apart from the merit of the artist's work, this painting has the value of being a historical document, casting a light on the terrible state of administration of justice in the fif-

teenth century. His work is particularly well represented in collections of art in the United States.

With Quentin Matsys and Gerard David, and perhaps Mabuse (Jan Gossaert) the early genius of the Flemish school is exhausted. Mabuse's style was very much influenced by the study of Italian painting. His picture of *The Virgin and Child*, in Berlin, shows the queer mixture of Italian and Flemish that he represents.

From about the beginning of the sixteenth century art in the Netherlands went through a period of imitation and reaction and peculiarities. Among the second-rate painters of the period one or two masters stand out—like Hieronymus (Jerome) Bosch, who painted rather amusing groups; and Pieter Brueghel, whose claim to renown is much greater.

THE ARTISTS WHO REVEALED IN PICTURES THE BEAUTY OF FLANDERS

Indeed there was a family of four Brueghels—two Pieters and two Jans—who were painters. Of them all, Pieter the Elder is the most individual and important. He is known as "Peasant Brueghel," and is called the father of peasant painting. All famous artists of genre pictures look back to him as their forerunner. He painted some quaint, attractive pictures. *The Children at Play*, in the Imperial Gallery, Vienna, is a whole book in itself on the life and amusements of little ones in the sixteenth-century Netherlands.

His pictures, humorous and sometimes coarse, show small figures set in landscape backgrounds. For Pieter Brueghel began to realize in his paintings the beauty of Flemish landscape. In his *Autumn*, in the Vienna Museum, and *Winter*, in the Imperial Gallery there, the dignity of nature takes the place of the dignity of the human form. In this branch of painting his son Jan (the Elder) followed him, becoming very noted for his landscapes, which hold an important place in the development of the art. His smooth technique won him the name of "Velvet Brueghel." He was an intimate friend of Rubens, and used to paint the landscapes in figure pictures for him and other artists, while they in turn painted little figures in his landscapes. Pieter and Jan each had a son of his own name, well known as a painter, though neither of these sons was the equal of his father.

THE LITTLE COMPANY OF ARTISTS THAT GATHERED AT AVIGNON

Early French art, which was very closely allied to the art of Flanders, centred first in Paris, in the Franco-Flemish school. When civil war in 1410, followed by other national disturbances, broke up the peace of that capital, the young art made its home in Touraine, Burgundy and Provence. A hundred years before this time the court of the pope had been moved to Avignon, and that beautiful town on the Rhone River had gathered to itself a small company of artists. Several pictures of this Avignon school remain, such as *La Vie de Saint Mitre*, which strangely recalls the Greek and Roman portraits found in Egypt. The masterpiece of the school is in the Louvre—a huge religious composition, a *Piéta*, where the dead Christ rests on Mary's knees.

In the early fifteenth century an artist who is remembered as Nicholas Froment of Avignon did some very fine work there. His most famous picture, presenting a religious subject, *The Burning Bush*, is now on the walls of the Cathedral of Aix-en-Provence.

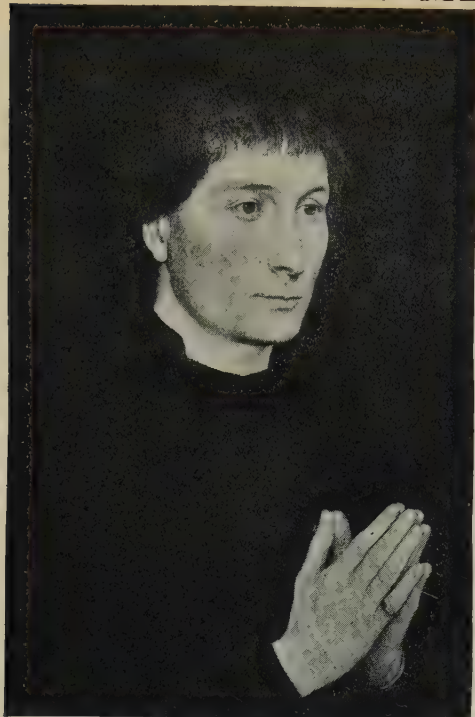
But Jean Fouquet (about 1411 to 1480) is truly the father of French Art, although he shows the influence of the Van Eycks and of Fra Angelico and other Florentines. His grave and dignified portraits in Berlin and Paris show his mastery over that branch of art, and his miniature paintings for missals are one of the glories of the French nation. The tranquil and gentle skies and fields of Touraine gleam in the pages of these sacred books, and are more than backgrounds—they are the very soul of France.

THE MEN WITH THE TOUCH OF GENIUS IN THEIR BRUSH

France gave her peculiar spirit to the Clouets, Jean and François, late fifteenth- and sixteenth-century painters, who belonged to a Flemish family. These men were masters of portraiture which combined the Flemish genius for honest recording of the character of the person painted with a peculiar lightness and casualness of touch. This fine airiness, this avoidance of unnecessary detail, was what the Clouets learned of France, and one can see in their work the beginnings of the great period which was to dawn later.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 1343.

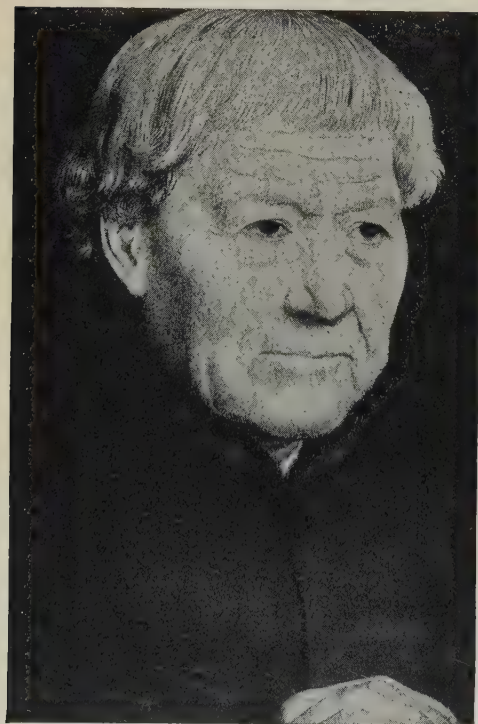
PORTRAITS BY MEMLING AND BOUTS



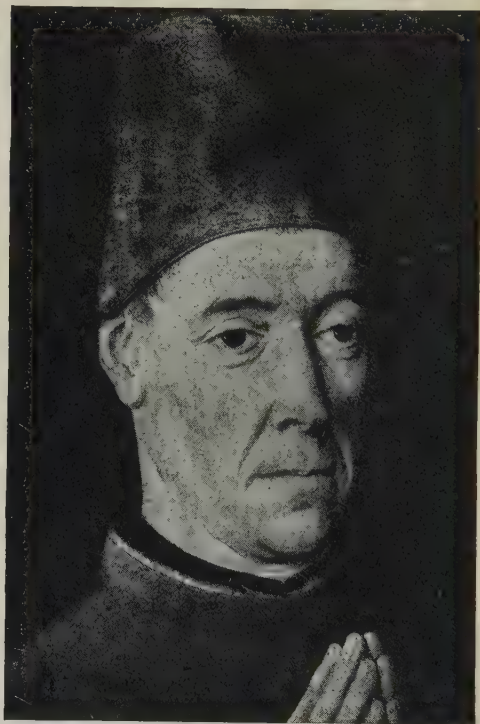
Thomas Portinari, by Hans Memling.



Marie Portinari, by Hans Memling.

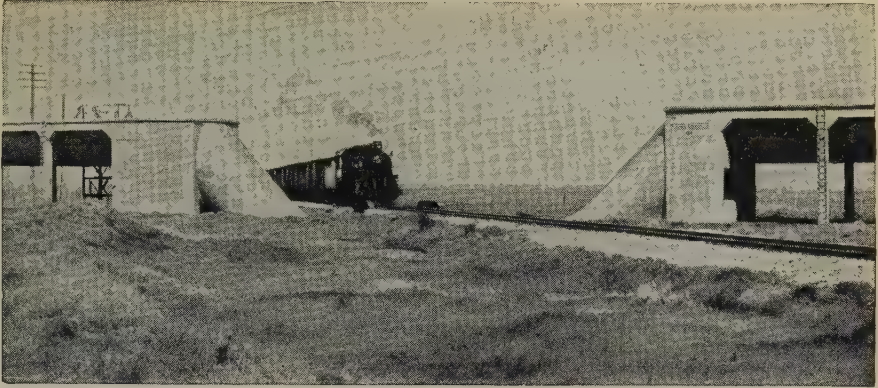


Portrait of an Old Man, by Memling.



Portrait of a Man, by Thierry Bouts.

Photos, courtesy Metropolitan Museum of Art.



An aqueduct that passes beneath the Canadian Pacific Railway line in Alberta.

WHY DOES WATER FIND ITS OWN LEVEL?

WHEN water, or any other liquid, is in an open vessel, such as a pitcher or tank or lake or ocean, the water will flow until its surface is level. This is one of the most familiar and obvious facts in all nature, and at the same time one of the most important. Indeed, were it not true, modern civilization would come almost to a standstill, for an enormous variety of operations depend on water's finding its level.

To understand it we must think carefully for a minute or two. As every particle in a mass of liquid is free to move about, it is clear that there must be no excess of pressure in any one direction, or the particle will be pushed in that direction. Every pressure must be exactly counterbalanced by an equal pressure in an opposite direction if the particle is to remain where it is.

Let us imagine for a moment a tank or basin in which a quantity of water is so arranged that its surface is on the slope. Now, a particle of water halfway down the surface would have the weight of certain other particles just above it pressing it downhill, and as there would be no particles at the same level on the opposite side to hold it up, it would naturally be pushed downhill.

This would be multiplied a myriad

CONTINUED FROM 1116



times in the case of other particles on the sloping surface, and we can therefore understand that no open body of water can remain at rest in a sloping position. Movement must of necessity go on until the whole surface of the water lies in a horizontal position. When that position is attained, the only force acting on the particles is that of gravity pulling them all vertically downward. There is no force pulling or pushing in any other direction that is not exactly counterbalanced by an equal and opposite force.

This tendency of a liquid to find its own level is made use of when it is desired to carry water from one hill to another. Instead of building a costly aqueduct to carry the stream of water across the valley at the same level all the way, it is simply run into an inclosed pipe that follows the hill down one side and up the other. The water, of course, runs down the pipe pulled by the force of gravity and pushed by the weight of water behind it. When it gets to the lowest level of the pipe it cannot remain there, for the pressure of the water behind goes on, and the water is pushed up the pipe on the other side until it reaches the same level as on the first side of the valley. Notice the picture at the top of the page.

**WHY ARE SHADOWS LONGER
AT THE END OF THE DAY?**

This is not true, for our shadows are equally long at the beginning and at the end of the day. When this question was asked, surely the questioner was calling the beginning of the day the time when most of us begin the day by getting up. But, of course, the day begins when the sun rises, which is sometimes hours before we rise in summer.

The length of a shadow depends on the height of the sun above the horizon. We can easily prove for ourselves that this must be so if we hold a light in our hand and raise it up and down, and notice how that affects the length of the shadow thrown by a pencil standing on end.

When the sun is low, either at the *real* beginning or at the end of the day, our shadows are longer; and if ever we had the sun right overhead, as we never do in this part of the world, our shadow would lie about our feet. We can easily see all this for ourselves with a candle and a pencil. Thus, it is in some measure possible to tell the time by the length as well as by the direction of the shadows.

**WHY IS IT DANGEROUS TO SLEEP
IN A DAMP BED?**

One of the greatest facts about water is the enormous amount of heat which it can hold, and the very great quickness with which it can take heat from anything else; in other words, it has a great capacity for heat, and is at the same time a very good conductor of heat.

When we sleep in a damp bed, then, the water in the sheets or blankets rapidly takes a large quantity of heat from our bodies—far more than dry sheets or blankets are capable of taking. This means that the temperature of our bodies is lowered because heat is taken from them more quickly than we can make it up by our burning. But if the temperature of the body and of the blood is lowered, its power of resistance to all sorts of microbes, such as those which cause pneumonia or inflammation of the lungs, and those which cause rheumatic fever, is also lowered to some extent.

And so we are very liable to get any of these diseases, or influenza, or bronchitis, or a common cold or some others. If we think that the sheets on a bed are damp, we should take them away and sleep in the blankets. It is not so comfortable, but is much better than getting pneumonia.

**WHY DOES A BOY'S VOICE BREAK
AND NOT A GIRL'S?**

When a boy's voice breaks, it is because his voice-box is suddenly becoming rather larger. As a girl grows up to be a woman, her voice-box grows steadily in proportion to the rest of her body. But, for some reason, nature prefers that men shall have much deeper and louder voices than women. In order that this shall be so, the larynx, or voice-box, must be much larger in proportion, and the vocal cords longer in men than in women.

This particular change begins to take place when a boy is about fourteen or fifteen years of age. It is not really necessary for a boy's voice to break; that is to say, it is possible for his voice to get steadily and evenly lower. But, as a rule, this does not happen, and the reason is, not that there is anything the matter with the boy's voice-box, but simply that he has not learned how to work it.

The muscles are getting bigger and heavier, the cords are getting longer, and this is happening very quickly, and, of course, it must mean that a new skill has to be acquired, just as if one has learned to play perfectly on a very small violin, and then had to play on a full-sized one. That is why the boy has not the proper control over his voice, and sometimes speaks in a low pitch and then suddenly in a high one.

**WHY DO WE SEE IN A MIRROR THINGS
NOT IN FRONT OF IT?**

We see things in the glass because it reflects to our eyes the light which first fell upon them, and which they then reflected to the glass. This is done according to the great laws of the reflection of waves, like those of light. The law is that the angle at which the wave approaches the surface which reflects it is the same as the angle at which the light will leave that surface. This law is strictly followed by all rays of light that strike the mirror; and if our eyes are rightly placed, we can catch the rays as they are reflected from the glass to our eyes.

If we think of a rubber ball instead of a ray of light, we shall understand this quite easily. Anyone standing far to one side of the mirror might throw a ball at an angle against it, and we know that it would come off the mirror at a corresponding angle. Thus we can see how the mirror can show us things that are not immediately opposite to its surface.

WHY HAVE LEAVES SO MANY DIFFERENT SHAPES?

The great idea which we learn to apply to every fact about living creatures is that these facts usually have uses. In this way we can explain the existence of leaves; we can explain why they are flat and thin, so that the light can penetrate them; we can explain also why they move so as to catch as much light as possible.

But in this, and in many other cases, there are certain facts which we cannot explain in terms of use. We can partly explain the shapes of some birds' eggs by showing that the shape is in some way helpful. But, on the whole, as regards the shapes of leaves and the shapes of eggs, we can give only the very poor explanation that they are what they are because it is their nature to be so.

There is such a thing as chance in the world—chance has its laws, as everything has laws. This applies in many ways in the not-living world; it applies also in the living world. Every living thing is made up of a vast number of different parts, and these may arrange themselves in different ways, just as the colored pieces in a kaleidoscope may arrange themselves in different patterns. The shapes of leaves and of the ornaments on the surface of many kinds of living creatures can perhaps be explained only in this way.

WHY DOES A DOG GO ROUND AND ROUND BEFORE IT LIES DOWN?

The answer to this question lies in the answer to another: What is a dog? We are so familiar with animals like dogs and cats and horses and pigeons that we often forget their history. Really the dog does not lead a natural life. All natural animals are wild; but these are tame—domesticated, as we say, which simply means "made homely."

Now, these domestic animals very often follow the habits of their wild forefathers, though hundreds of generations may have passed since those forefathers were wild. This is a very wonderful fact, showing how things are handed on from parents to children, very largely without reference to what the outside circumstances may be. The dog, turning round and round before it lies down, gives us an instance of one of these inherited habits.

The dog's far-away ancestors were animals that lived in the jungle-grass, and if they wanted a comfortable bed they

had to turn round and round a few times so as to level the grass. As the habit is really inherited, and is natural in the dog and has not been taught it by itself or anyone else, we call it an instinct. If it were a thing learned by the dog, like a trick, it would not be an instinct.

This leads to a further question, too difficult for us to answer until we have learned more than we yet know. We might ask: How did this habit first begin? For it must have had a beginning; but how it began we cannot yet say, though we are aware of what happens when it has begun.

CAN A FROG LIVE INSIDE A STONE?

Toads and frogs are rather frequently found imprisoned in coal and stones; and people have often been inclined to jump to the conclusion that the frogs had been imprisoned ever since the coal or stone was laid down, as if frogs had therefore an extraordinary power of living for hundreds or millions of years without food and air. It is, of course, not true. Men of science could not believe that frogs had any such remarkable vitality, and Dean Buckland made experiments which proved that frogs die within a year if deprived of both air and food, and that they cannot live two years without food even if given plenty of air.

The frogs that are found in holes in stones and coal from which they cannot escape must have crept in through some crevice when they were quite small, and have found enough food to make them too big to creep out again. With a little air and a few insects to eat they might live a few years, but certainly not longer than ordinary frogs, and never, of course, for centuries.

WHAT IS THE SUN MADE OF?

Not very many years have passed since it was said that this was a question to which no answer could be given. At that time no one had guessed the wonderful fact that by holding up a prism to sunlight and noting what the light looked like after it had come through the prism we should be able to tell exactly and positively what chemical elements must be in the sun.

When the light was studied in this way, it gave us evidence of the presence in the sun of certain things quite different from the elements we know upon the earth. But the great and never-to-be-forgotten

fact is that we find clear evidence that the sun is made of the same familiar elements that go to make up the earth.

WHAT IS MEANT BY A POISON?

The living stuff which makes the living part of all animals and all other living creatures is called *protoplasm*, and the poisons which destroy this simple living stuff destroy every form of life. Their deadly dose varies, and some of them are valuable as medicines in small doses; but there is no question as to their real nature. The best-known poisons of this kind are prussic acid, arsenic, phosphorus, alcohol and chloroform.

The first need of all life is to breathe, and so we might expect these poisons to act by interfering with breathing—not so much with merely getting air into the lungs, but with the real breathing, or burning, which goes on in a muscle, a leaf, a microbe or any other living creature. And we find that, in various ways, these poisons interfere with the *oxidation*, or the burning, or breathing, of living cells.

Prussic acid, alcohol and chloroform stop the working of the breathing-centre in the brain, and they also prevent oxygen's being given up by the red cells in the blood. They fasten it to these cells, so to speak, so that it does not become distributed as freely as it should be, and the cells that really cannot live without it are suffocated and die.

IN WHAT WAY DOES A FERN GROW?

A fern does not bear flowers, and a plant that has no flowers can produce no seeds. A fern reproduces itself by means of spores which, although performing a somewhat similar function to seeds, are very different in structure. Instead of being a complicated object like the seed of a flowering plant, a spore is merely a simple cell.

On the under-side of a fern frond we may generally see a number of little raised patches brown in color. Each of these consists of a group of capsules, sporangia, containing the spores of the fern. Perhaps the most familiar form is that seen in the male fern and the common polypody. A little ring runs round one side and over the top of the capsule, and when this dries up the case springs open and the spores are shot out on the damp ground beneath.

Moisture causes the spore to swell and

germinate, producing first a row of cells, then a surface of cells, and finally a flat, heart-shaped object called a prothallium. This, however, is not a new young fern. The prothallium must first produce male and female parts, and it is the cooperation of these which leads to the growth of the new plant. The male parts arise among the root-hairs at the tip of the prothallium, and the female parts at the opposite end near a little notch. The male parts next break up into what are called mother-cells, each one containing a coiled-up body that eventually gets free and, entering the female part, develops into a young fern. Thus, instead of being like a flowering plant which produces a seed from which develops a new plant, the fern produces a spore which must grow into a prothallium, and then the prothallium must develop male and female parts to produce the new fern. The number of spores produced by a fern is enormous. One scientist estimates that a single fern scatters a billion spores in one summer.

WHY DOES A FACTORY HAVE A TALL CHIMNEY?

We know only too well that the business of the chimneys is to carry the smoke from the furnaces into the air. It may be that if the chimneys are tall it makes a better draft for the furnaces, but that is not the only important thing. According to our present way of burning coal, a large amount of the coal is wasted, simply blown up the chimney in the form of smoke. This injures everybody and everything—men, animals, plants, pictures, houses, and all. The higher it is sent into the air, the better is its chance of being blown away and thinned out before it settles. Evidently it would not do to have a chimney discharging factory smoke at the level of the windows of our bedrooms, schoolrooms or libraries.

But we fear that tall chimneys will be wanted, ugly as they are, even when we burn our fuel in factories in a proper way, and discharge into the air only the gaseous products of complete burning. Even in the most perfect kind of burning there must always be carbon dioxid, as the chief element in fuel is carbon, and carbon dioxid is completely burned carbon. This gas, which we produce ourselves as we burn, is a poison to us if we breathe in too much of it, and so it must be sent by tall chimneys into the air.

WHAT IS THE STUFF WE CALL QUICKSILVER?

Quicksilver is a good name for one of the elements. Now, silver is an element, but quicksilver is not silver, though it has a silvery appearance. When we say "quick" nowadays, we think of something moving, but the old meaning of quick is "alive," and quicksilver means "live silver." It is so called because it seems to move by itself. When quicksilver is spilled on the ground, it splashes into little balls of fluid metal which run around. The chemical name for it means "water-silver," but the name by which it is generally known is *mercury*, which was the name the Greeks gave to the messenger of the gods.

We have said that quicksilver, or mercury, is an element, and we know now what that means. It is not a kind of silver, nor a mixture of water and silver, nor anything else but itself. It belongs to the group of the metals, like gold and silver, lead and iron; but it is unlike all other metals in being liquid at ordinary temperatures. Of course other metals, like gold and iron, can be made liquid, but that happens only when they are intensely hot.

IS THE KNOB ON THE SEAWEED FILLED WITH AIR?

What we call air is a mixture of various gases, and any gas may be called air. For instance, when carbon dioxide was found to come out of heated chalk it was called "fixed air"—the air, or gas, that had been fixed in the chalk. So we may, perhaps, give the name of air to that which we find filling the knobs on seaweed, and, like the air we know so well, it is certainly a mixture of gases, but it is not the same mixture as our atmosphere.

The question may be asked, How does this air get into the knobs of seaweed? A seaweed, like all other living things, must breathe. This means that it takes into itself, through its surface, some of the oxygen dissolved in the sea-water around it. It also produces the gas called carbon dioxide within itself, just as we do, though the whole process goes on very slowly indeed in the seaweed, as compared with ourselves. From the facts that have been mentioned we should therefore expect to find that the mixture of gases in the knobs on the seaweed shows that it is obtained partly from outside and is produced partly from within.

We must remember, also, that a piece of dead or dying seaweed, in surroundings unnatural to it, and exposed to the air and the sun, will undergo changes, and several of the compounds that make up its body will yield gases that may contribute to the contents of the knobs.

WHY DID NOT THE EARTH BURN UP WHEN IT WAS A BALL OF FIRE?

We know that burning is the thing that happens when anything is combined with oxygen. We know, too, that many things, when they are made hot, will burn in this way. If these laws were true long ago, as they are now, the earth should have burned up, as you say. Well, the answer is that the earth did burn up partially, so far as the outside of it is concerned. All the sea is burned; all the water everywhere has been made by the burning-up of hydrogen, and most of this happened long ago, when the earth was cooling down from a ball of fire. Not only are seas and oceans burned, but the land is burned also. We cannot easily burn clay and rocks and stones, for the very good reason that these are the results of the burning-up or combining with oxygen, which went on as the earth was cooling down from its hottest state ages ago. Apart from things which have been made by life, such as coal, there is very little indeed of the surface of the earth that is not already burned; and it was burned just in the way this question suggests.

WHEN BEES TAKE HONEY FROM FLOWERS DO FLOWERS GET MORE?

It is a mistake to suppose that bees get ready-made honey from flowers. No flowers contain honey as we know it; honey is a thing specially made by the honey-bee from materials derived from the flower. The sugary material produced by the flower is not honey, and does not exist to serve the bee. It is made by the flower for its own purposes, but it serves the flower indirectly, because the visit of the bee is of value to it.

The flower does get more of this material, although it can by no means make a fresh supply at once, because the production of the sugary substance, to which the bee helps itself, is a long and difficult chemical process, depending upon sunlight, the drawing-up of water from the soil, and the slow building-up inside the plant of sugar and other complicated chemical materials.

THE NEXT WONDER QUESTIONS ARE ON PAGE 1353.

THE COUNTRY HOME OF JOHN MILTON



Milton's cottage at Chalfont St. Giles, where the poet went to escape the great plague.



Milton's first love.—From the painting by G. H. Boughton, R.A.



John Milton as a boy, a youth and a man.

JOHN MILTON AND HIS POEMS

JOHN MILTON, whom good judges of books place next to Shakespeare among English poets, trained himself from boyhood to be a poet. Early in life he dreamed of writing something the world "would not willingly let die."

From a child he was an eager reader, a writer and a rhymers. The hymn

Let us with a glad some mind
Praise the Lord, for He is kind,

a paraphrase of the 136th Psalm, was written by Milton when he was fifteen, and before he was twenty he had produced much Latin verse, and was known at the university as a scholar and poet.

Milton's birth was nearly eight years before Shakespeare's death. He was born on December 9, 1608, at the Spread Eagle, Bread Street, off Cheapside, London, the very street in which stood the Mermaid Tavern, where Shakespeare met the friends who wrote plays with him.

Possibly before he was eight years old the studious boy, John Milton, may have seen Shakespeare pass down Bread Street to the Mermaid, on a visit from his country home.

In those days it was the custom for a man engaged in business to hang outside his door a sign by which his place of business could be easily recognized, and following this custom,

CONTINUED FROM 1125

Milton's father used the sign of the Spread Eagle. The older John Milton was a scrivener, that is to say, he drew wills, prepared other documents, and in fact did much of the work that in our day is done by lawyers. He was a well-educated man of good family, who had prospered in his business, and was highly respected. He was an excellent musician, loved art and literature, and both he and his wife were deeply religious. Probably in all England there could not have been found a more delightful home than the one in which the future poet spent his boyhood. He had several brothers and sisters, but only two lived to grow up: a sister, Ann, who was several years older than he, and a brother, Christopher, who was several years younger and who afterward became a lawyer.

John Milton's parents were proud of their handsome, gifted son, and had his portrait painted when he was ten years old. At this age, too, his education had been well begun. He had already been sent to a school in Essex, and now had a tutor at home. Two years later he went to St. Paul's school, which was noted for its teaching of Greek and Latin. At the age of sixteen he was ready for college. He chose Christ's College at Cambridge University, the same college which the

poet Spenser had attended, and there he spent seven years of deep study.

The handsome young Puritan, described by one who knew him as "a harmonical and ingenious soul in a beautiful and well-proportioned body," determined to be a pure-minded, good man, and to write great poems for distant generations. Noble poems, he felt, should be *lived* by the man who wrote them. The real beginning of Milton's poetry is a beautiful story. It was Christmas Eve in 1629, when he had just turned twenty-one. The starry night mingled in his heart wistful thoughts of his own God-given poetic gifts, and devotion to the Savior who on that night long ago "Our great redemption from above did bring," and these thoughts shaped themselves into an Ode on the Morning of Christ's Nativity. The poet begins the consecration of his pen by asking:

Say, Heavenly Muse, shall not thy sacred
vein
Afford a present to the Infant God?
Hast thou no verse, no hymn, no solemn
strain
To welcome Him to this His new abode,
Now while the heaven, by the sun's team
untrod,
Hath took no print of the approaching light,
And all the spangled hosts keep watch in
squadrons bright?

See, how from far, upon the Eastern road,
The star-led wizards haste with odours
sweet:
O, run, prevent them with thy humble ode,
And lay it lowly at His blessed feet;
Have thou the honour first thy Lord to
greet,
And join thy voice unto the angel-choir,
From out His secret altar touched with hal-
lowed fire.

Then follows a hymn telling of the coming of the Babe to Bethlehem and the retreat of the false gods.

In 1632 he left Cambridge with the degree of M. A., and went to his father's country house at Horton, in Buckinghamshire, where five years more of his life rolled on in the study of books and nature and the writing of poems which rank among the finest in the world.

Of the poems written during these years of training, *Arcades*, a masque set to music by Lawes, one of the king's musicians, was a slight work suited to the open-air performances then fashionable. *Comus*, another masque, performed at Ludlow Castle, and interspersed with

songs, for which Lawes again made the music, is a beautiful poem showing how Virtue may pass unscathed through temptation—a truth illustrated by Milton's own life. This is his testimony: "I take God to witness that I lived untouched from all profligacy and vice, having perpetually before me the thought that I could not escape the eyes of God."

Comus tells how a lady, pure of heart, is lost by night in a wood and is met by an evil-minded magician disguised as a shepherd, who uses all his power to deceive her, but

No evil thing that walks by night,
In fog or fire, by lake or moorish fen,
Blue meagre hag, or stubborn unladen ghost
That breaks his magic chains at curfew time,
No goblin, or swart fairy of the mine,
Hath hurtful power o'er true virginity.
So dear to Heaven is saintly Chastity,
That, when a soul is found sincerely so,
A thousand liveried angels lackey her,
Driving far off each thing of sin and guilt.

One of Milton's early poems, *L'Allegro*, is descriptive of a man whose mind is inclined to thoughtful mirth; and another, *Il Penseroso*, tells how a night may pass when one is in a pensive mood. In each Milton is the man, and his mind is full of poetical thoughts, drawn from his reading of ancient and modern poetry and his observation of nature.

A form of Milton's lovely gift of song was his way of using the sound and sway of words for the brighter or darker coloring of the thought he was expressing. Thus *L'Allegro* trips to its own gaiety; *Il Penseroso* has a statelier measure; and the third of Milton's earlier poems, *Lycidas*, a lament for the death of a college friend who was drowned in crossing to Ireland, has a mournful sweetness that forever haunts the reader. It was customary at Cambridge to write a poem on the death of a scholar-friend, and Edward King, the friend to whom Milton gives the poetic name of *Lycidas*, was himself a poet. Milton had written several elegies, but never before with the feeling shown in these lines that echo and re-echo beauty of tone.

Yet once more, O ye laurels, and once more
Ye myrtles brown, with ivy never sere,
I come to pluck your berries harsh and crude,
And with forced fingers rude
Shatter your leaves before the mellowing
year.

TWO SCENES IN THE LIFE OF JOHN MILTON



Milton was a great thinker in the days of the Commonwealth, when Oliver Cromwell ruled England with a firm hand. Both men did imperishable service to their native land. The poet in those days could not have lived by his poetry, and he was employed to conduct the official correspondence of the country with foreign powers in the Latin language, then used for that purpose. While so employed he lost his eyesight, and had to have a colleague in his work. This colleague was a fine poet and a man of upright character, Andrew Marvell by name. In this picture, by G. H. Boughton, R.A., we see Marvell shaking hands with the blind poet, whom at the Restoration he probably saved.



As Milton was blind during the last twenty years of his life, and in those years composed some of his greatest poems, including *Paradise Lost* and *Samson Agonistes*, his daughters had to be his eyes and write down the words as he dictated them. In this picture by Munkacsy we see his daughters thus engaged, and perhaps unwillingly. For they grew tired of the arduous work which their father's blindness required of them, and in the later years of his life they behaved in an undutiful way, much to the sorrow of the great poet.

Bitter constraint, and sad occasion dear
Compels me to disturb your season due;
For Lycidas is dead, dead ere his prime,
Young Lycidas, and hath not left his peer.
Who would not sing for Lycidas? He knew
Himself to sing, and build the lofty rhyme.
He must not float upon his watery bier
Unwept, and welter to the parching wind
Without the meed of some melodious tear.
For we were nursed upon the self-same hill,
Fed the same flock, by fountain, shade, and
rill,

Together both, ere the high lawns appeared
Under the opening eyelids of the morn,
We drove afield, and both together heard
What time the gray-fly winds her sultry horn,
Battering our flocks with the fresh dews of
night,
Oft till the star that rose at evening bright
Towards heaven's descent had sloped his
westering wheel.

But oh! the heavy change now thou art gone,
Now thou art gone, and never must return!
Thee, shepherd, thee, the woods, and desert
caves,
With wild thyme and the gadding vine o'er-
grown,
And all their echoes, mourn.

All this was formal according to the
scholarly Latin verse he was imitating,
but it was beautiful beyond all other
formal English verse.

His mother's failing health had kept
him at home, but when she died he set
out to see for himself those wondrous
towns and countries of the Continent
whose stories and literature he knew so
well. So for about fifteen months he
wandered among the storied towns of
Italy and France, and the influence of
the classic scenes of Italy did much to
shape his thoughts toward the later
poetical achievements of his life. He
made many friends, especially in Flor-
ence, and paid a visit to the famous
Galileo, at that time an old man and
blind. He had meant to spend a longer
time in Italy, but the news of the political
troubles in England called him home.

MILTON RETURNS TO LONDON ON THE EVE OF THE CIVIL WAR

When he returned to London in
1639 the struggle between the people
and the king, which three years later
resulted in the Civil War, had become
so serious that the whole country was
unsettled. Milton was a man of peace,
and instead of taking part in this great
agitation, except by writing a series of
bitter attacks upon the bishops, he
devoted himself to the quiet task of
teaching, and had a sort of boarding-
school for a number of years in Aldersgate

Street. But the bitterness of the struggle
which was going on in these unhappy
days entered into the poet's life in a
strange way.

He married a lady who belonged to a
Royalist family and had been brought
up with the gay manners of the Cavaliers,
who were the opponents of the Puritans.

MILTON MARRIES A ROYALIST LADY BUT IS STAUNCH TO THE PURITAN CAUSE

As Milton was, in his ways of life, the
gravest and most frugal of Puritans, it
was not likely that his young wife
could immediately find happiness with
him, and after a few weeks she returned
to her father; but two years later,
when the fortunes of war had gone
against the Royalists and Mary Milton
had learned that life is something more
than dancing and merry parties, she
returned to her husband, and even her
father was glad to have the shelter of
the poet's roof.

Milton, in the meanwhile, had been
writing not poetry but prose, and his
finest work of this period was entitled
Areopagitica. That is a Greek word for
an oration addressed to the ancient Coun-
cil of Athens, which was known as the
"Areopagus," and Milton gave this title
to his work because it was addressed to
the Parliament of his own country. The
Areopagitica is a noble plea for liberty
of thought and especially the right to
publish in print one's honest opinions.
Though its prose is difficult and wordy,
it is inspired by fine feeling. Another
prose work of Milton's, in which he de-
fended the execution of Charles I, had
an important bearing on his life, for it
was esteemed so highly by the Puritan
Government that Milton was appointed
Latin Secretary to the Council at a hand-
some salary. His work was to draft the
correspondence of the Government with
foreign powers, which was then carried
on in the Latin language.

THE SAD, SIGHTLESS DAYS AT THE CLOSE OF MILTON'S LIFE

A new period of the poet's life now
began. Eminent in the public life of
his day, his great literary powers were
employed, not only in translating State
correspondence, but in defending the
Puritan Government against its critics
on the Continent. In 1653 he was left a
widower with three young daughters to
look after; but the greatest trial of
his life befell him about the same time.

A GREAT ARTIST'S VISION OF CREATION



Doré's picture of the creation of birds and sea animals in the childhood of the world.
This is one of the famous French artist's illustrations to Milton's *Paradise Lost*.

His eyes, which had been weak from boyhood, now failed him completely, and by the year 1654 the poet was blind. Still he bravely faced his work as Latin Secretary, first with an assistant, and afterward with the aid of a colleague, Andrew Marvell, who was himself a poet of great power and a man of fine character. For the sake of his motherless children he married again, but his second wife died some fifteen months after the wedding, so that Milton's daughters were left without a mother's guidance, and in later years were a trial to their sightless father.

As the Protectorate drew to a close, Milton turned to the task of writing the great poem he had always meant to write, and probably it was fairly well advanced when the return of Charles II caused the poet to hide from fear of his political enemies. They, however, allowed him to live in peace, and perhaps by 1653, certainly by 1655, *Paradise Lost* was finished.

The writing of *Paradise Lost* was, to Milton, a religious exercise. His aim was to "justify the ways of God to man," and he began by humbly asking the Divine Spirit to instruct him while he told of the fall of angels and of man. A spirit of profound reverence, which suits well the dignity of the blank verse, is preserved throughout. The tone of the poem is lofty, majestic and pure.

No other poet has such power of imagination, creating scenes and beings beyond the reach of human experience, and by the dignity of his verse preserving all their mystery.

The great poem is written in what is known as epic form. It is based on Scripture, and tells the story of the angels who fell from heaven and the temptation and fall of man. Like all epics, it commences in the middle of the tale. The rebel angels, cast "with hideous ruin and combustion down to bottomless perdition," regain their steadfastness of mind in the midst of the fiery gulf. Satan, the great rebel chief, is the first to recover himself and make his way to the shore of the "inflamed sea." There he calls his hosts around him in orderly array, and Azazel, "a cherub tall," unfurls his mighty standard. Here is the picture of the bad, sorrowful angel as he prepares to speak to his downcast host of followers:

He, above the rest
In shape and gesture proudly eminent,
Stood like a tower. His form had not yet lost
All its original brightness, nor appeared
Less than an Archangel ruined, and the excess
Of glory obscured: as when the sun, new-risen,
Looks through the horizontal misty air
Shorn of his beams, or, from behind the moon,
In dim eclipse, disastrous twilight sheds
On half the nations, and with fear of change
Perplexes monarchs. Darkened so, yet shone
Above them all the Archangel. But his face
Deep scars of thunder had intrenched, and
Sat on his faded cheek, but under brows
Of dauntless courage and considerate pride,
Waiting revenge.

This great chieftain of the underworld then speaks to his comrades in guilt and excites them to further war, but war by guile, against Man, that thereby God may be grieved.

"But these thoughts
Full counsel must mature. Peace is de-
spaired
For who can think submission? War, then,
war
Open or understood, must be resolved."
He spake; and, to confirm his words, out-
flew
Millions of flaming swords, drawn from the
thighs
Of mighty Cherubim. The sudden blaze
Far round illumined Hell. Highly they raged
Against the Highest, and fierce with grasped
arms
Clashed on their sounding shields the din of
war,
Hurling defiance toward the vault of Heaven.

The exiled fiends now proceeded to build themselves a gorgeous palace-home, Pandemonium, and there they sat plotting—

A thousand demi-gods in golden seats.

They resolve that they will try to injure man, of whose creation in the Garden of Eden they have heard rumors.

Satan volunteers to go in search of the new world, and, aided by Sin and Death, comes at last through dreadful chaos to where it hangs suspended from heaven by a golden chain.

At this point the poet bursts into an invocation to Light as a prelude to a picture of heaven, and pitifully laments his own blindness.

With the year
Seasons return; but not to me returns
Day, or the sweet approach of even or morn,
Or sight of vernal bloom, or summer's rose,
Or flocks, or herds, or human face divine;

But cloud instead, and ever-during dark
Surrounds me, from the cheerful ways of
men
Cut off.

In heaven God sees Satan approaching
the world, and foretells to His only Son
how man will be tempted and will fall,
but the Son declares that He will become
man and bring salvation to the race.

Adam and Eve, "God-like erect, with
native honour clad," as they pass hand
in hand,

For contemplation he, and valour formed,
For softness she, and sweet attractive grace,
that Satan himself almost relents, and
grieves over the evil work he has come
to do. Meantime, Uriel, who suspected
Satan of looks "alien from heaven" as



Mr. Oliver Cromwell visits Mr. John Milton.

This fine picture, painted by Mr. David Neal, is printed by permission of the Berlin Photographic Company, N. Y.

Satan, now flying toward the earth,
disguised as a stripling cherub, meets
the archangel Uriel, and though Uriel
is "the sharpest-sighted spirit of all in
heaven," Satan deceives him into point-
ing out the way to Adam in Paradise,
for angels are so pure that they cannot
discern hypocrisy.

Lovely descriptions of Paradise follow.
So sweet is the place, and so noble are

he was flying toward the earth, descends
and warns Gabriel, chief of the angelic
guards of Paradise, to keep careful
watch.

Now came still Evening on, and Twilight
gray

Had in her sober livery all things clad;
Silence accompanied; for beast and bird,
They to their grassy couch, these to their
nests

Were slunk, all but the wakeful nightingale.

She all night long her amorous descant sung.
Silence was pleased. Now glowed the firmament

With living sapphires; Hesperus, that led
The starry host, rode brightest, till the Moon,
Rising in clouded majesty, at length
Apparent queen, unveiled her peerless light,
And o'er the dark her silver mantle threw.

Adam and Eve retire to rest, and the
angel-guards, Ithuriel and Zephon, searching
the garden, find Satan squatting like
a toad close to Eve's ear to taint her
dreams.

Him thus intent Ithuriel with his spear
Touched lightly; for no falsehood can endure

Touch of celestial temper, but returns
Of force to its own likeness.

So Satan changes into his own form
"of regal port, but faded splendor wan,"
and, after some altercation with his captors,
flies away and hides himself for
seven nights, circling round and round
in the shadow of the earth.

In the morning Adam and Eve, lowly
bowing and adoring, offer to their
Maker their hymn of praise. The Almighty
now sends to Eden the archangel
Raphael, who warns Adam of his danger,
and tells him the story of Satan's disobedience
and fall. He also tells how the earth began,
and why—in order that another race, that
of man, might take in heaven the places
of the outcast angels, lest Satan should
feel a pride in having "dispeopled
heaven."

Satan now returns and takes the form
of a serpent. Eve in the morning suggests
to Adam that they shall work apart
in the garden till noon; he doubts the
wisdom of it, but after urging her to be
watchful at last gives way.

Searching through the garden, Satan
discovers her alone, and by flattery persuades
her to disobey the command of God and eat
of the forbidden Tree of Knowledge. Fearing
the effect may be separation from Adam,
she resolves that he, too, shall eat, that they
may live or die together; and

He scrupled not to eat
Against his better knowledge, not deceived,
But fondly overcome by female charms.

The guilty pair soon become remorseful,
unhappy and quarrelsome. Satan, returning
to Pandemonium, is received with loud
applause by all his followers, which changes
into a hiss as he and all his hosts are turned
into crawling snakes.

After a time both Adam and Eve feel
"sorrow unfeigned and humiliation meek"
for their fault, and the archangel Michael
is sent to tell them that their repentance
will be accepted by God, and that at last
the race will be redeemed; but meantime
Paradise can no longer be their home.
The angel having led them forth,

Some natural tears they dropped, but wiped
them soon,
The world was all before them, where to
choose
Their place of rest, and Providence their
Guide.
They, hand in hand, with wandering steps
and slow
Through Eden took their solitary way.

For this poem, which was published
in 1667, the poet received only fifty
dollars.

After writing his masterpiece, Milton,
as a sequel, added *Paradise Regained*, picturing
the final defeat of Satan through our
Lord's resistance of his temptations
in the wilderness. This poem, though
written before *Paradise Lost* was published,
was printed four years later—that is,
in 1671.

With *Paradise Regained* was included
Samson Agonistes, the last of Milton's
writings, a drama modeled on the Greek
style, which nobly tells a story of profoundest
pathos. The picture of Samson, shorn, blind,
in the midst of his enemies, with the religious
hopes of his nation beclouded, is a picture
of Milton himself in his latter days.

The story is nobly told, and when the
heroic end comes we feel the appropriateness
of the calm lament—

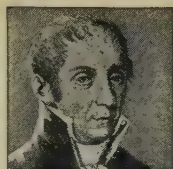
Nothing is here for tears, nothing to wail
Or knock the breast; no weakness, no contempt,
Dispraise or blame; nothing but well and fair
And what may quiet us in a death so noble.

Three years after the publication of
Samson Milton died, not an old man, as
we count age now, not yet sixty-six, but
his strenuous life passed and his noble
youthful ambitions fulfilled. He is buried
in St. Giles's Church, Cripplegate, London,
and no purer or more lofty spirit has
ever joined that

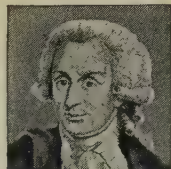
Garden of death where the singers whose
names are deathless
Singing together make music unheard of
men.

THE NEXT STORY OF LITERATURE IS ON PAGE 1357.

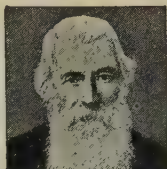
The Book of MEN AND WOMEN



Alessandro Volta.



Luigi Galvani.



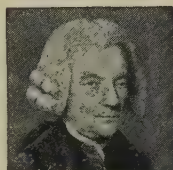
Sir Joseph Swan.



John Canton.



Michael Faraday.



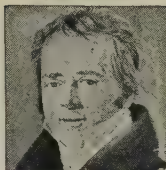
Sir William Watson.



Otto von Guericke.



Robert Boyle.



Hans Oersted.



Sir Humphry Davy.

MEN WHO FOUND ELECTRICITY

ELECTRICITY is one of the most wonderful forces placed ready for the service of mankind, yet it is one of the things which hid its secret longest from us. Men discovered how to turn the strength of animals to account; how to make the winds drive our ships across the seas; how to apply the power stored up in coal; how to raise steam, and with it change the face of the world. Yet electricity is greater than these. It can do almost anything. It can light a city, supply power for lifting the heaviest weights, drive trains and trolleys, cook a dinner, heal a sick child, and kill us if we are not careful. It is in almost everything, though it does not move. All that we have to do is to excite it, to bring it out, then catch it, so that we may use it as we need it. It is so valuable and does such marvels that we can hardly believe it existed for thousands of years in the earth and in the air quite unknown to men.

The very name of electricity tells a story of the mystery in which it was hidden for thousands of years from men. A great Greek named Thales, of whom we may read on page 201, and who lived nearly seven hundred years before Christ was born, noticed that amber, when rubbed with another material, became heated, and that when in that condition it would draw toward itself little pieces of feathers and other

CONTINUED FROM 996



tiny light articles. It is said that in the old time the women of Syria used amber to catch up leaves, straws and other things clinging to their clothes.

A great writer named Pliny, who was born in the year 62 A.D. and died about 114, wrote about amber and its ways. He likened it to the lodestone, the properties of which were well known in his day. The lodestone is a certain ore which, if allowed to hang free when suspended by a string, will always turn one of its points toward the North Pole and the other toward the South Pole, and will attract other metals toward itself. Another thing that Pliny knew was that the electric fish can give such sharp electric shocks as to make a man quite ill. But he never thought that there was any connection between the power of the amber, the fish and the lodestone.

It was not until the sixteenth century was half spent that the world began to take a real interest in electricity. Then William Gilbert, a thoughtful scholar, who was one of Queen Elizabeth's doctors, set himself to make experiments with a number of substances to see whether they, like amber, would, when warmed by friction, attract other bodies. He found that many, including sulphur, sealing-wax, gems, solid resin, rock-salt and a number of other things, had the same power. They

would attract metals, stones, earths, fluid, and even heavy smoke.

THE COLCHESTER MAN WHO GAVE ELECTRICITY ITS NAME

As the first man to examine the question, he had to find a name to describe the condition which he excited in these objects. Now, as amber was the first substance known to possess this power of attraction, and as the Greek name for amber is *elektron*, Dr. Gilbert gave the name *electricity* to the condition which heat and friction excited in the things he tried. He is called the father of electrical science. Gilbert lived sixty-three years, and died in 1603. His life was very valuable to the world, for every year from the time he began his discoveries our store of learning concerning electricity has gone on increasing.

Gilbert was a Colchester man. He was followed by a famous Irishman, Robert Boyle, a son of the Earl of Cork. Boyle was born in Munster in 1627, twenty-four years after the death of Gilbert. He was an unusually clever student as a boy, and at ten learned algebra simply because he loved to exercise his mind. He invented a famous air-pump, and taught the world all about the condition and qualities of air. His work for electricity was to show that electricity remained for some time in a substance after rubbing had ceased; and to add new substances which could be electrified. The mere fact that he was noticing electricity was sufficient to set other men thinking about it, for his reputation was very high, especially with the great men on the continent of Europe.

THE MAN WHO FASTENED TWO THINGS TOGETHER WITH NOTHING

Boyle died in 1691, five years after the death of Otto von Guericke. This clever man was born at Magdeburg, Prussia, in 1602, and after an excellent education visited England and became acquainted there with the scientists of that day. He invented the first air-pump, but that of Boyle was so much better that the Prussian invention was soon forgotten. Guericke was the first man to show the immense power of a vacuum. He made two hemispheres of metal—that is, two large metal cups, the edges of which fitted together. There was a tap fixed in one, through which the air could be drawn out by the air-pump. When this was done, so tightly did the two hemispheres cling together that not until the united

strength of thirty horses had been employed, fifteen on each side, could they be pulled apart.

While his name is most closely linked with the experiment of the Magdeburg hemispheres, Guericke must be remembered as the man who invented the first crude electrical machine. What he did was to make a globe of sulphur and fasten it in a wooden frame so that it could be turned round and round. When with his hand he pressed a cloth against the sulphur as it was revolving, the globe became charged with electricity. He it was who discovered also that bodies that have not been electrified by friction become electrified when brought into contact with other bodies which have been electrified.

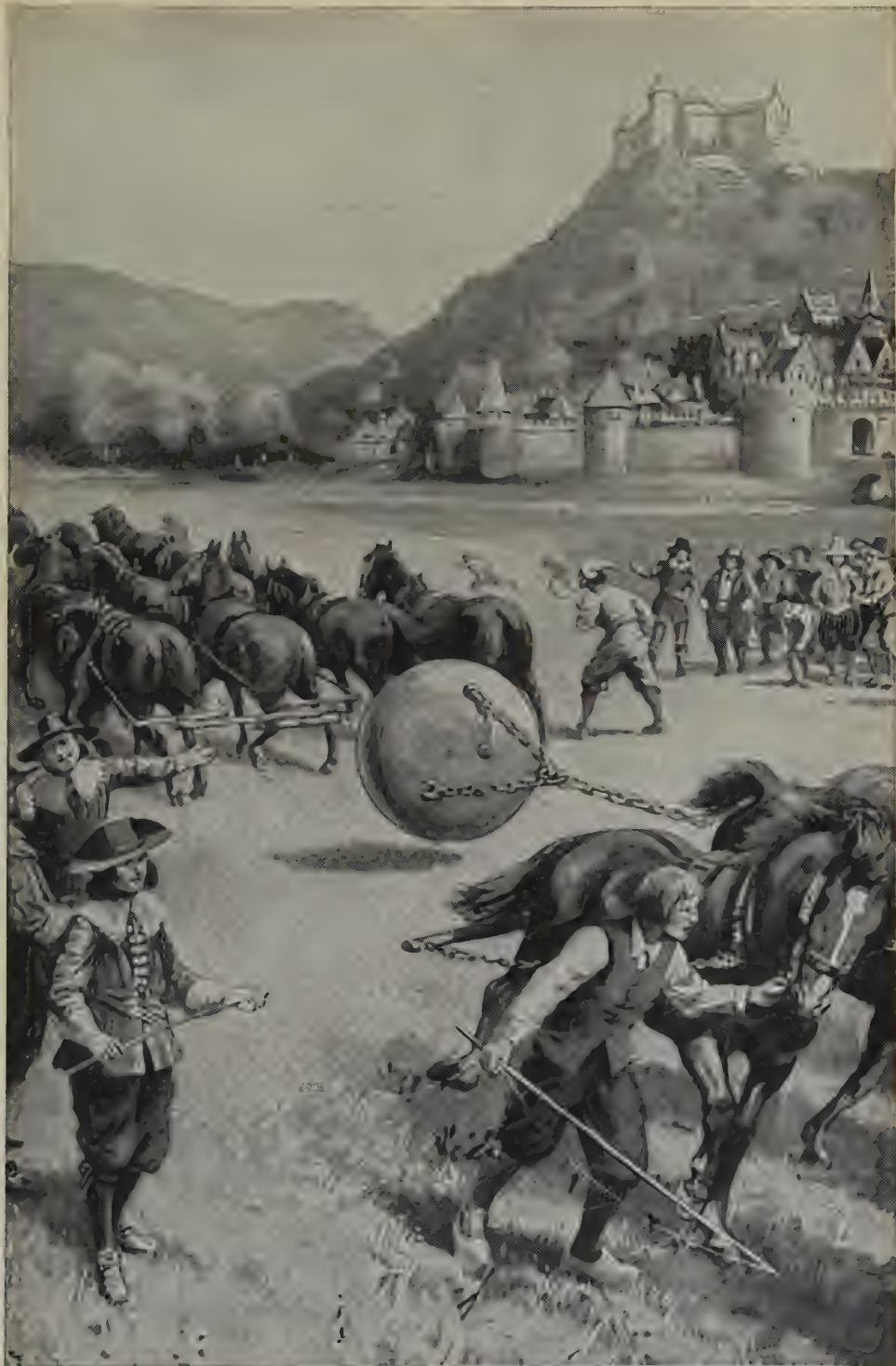
Sir Isaac Newton did one notable thing for electricity by showing that a disk of glass, when placed in a brass cylinder and electrified, would attract paper so strongly as to make it leap about in the cylinder.

THE MAN WHO SHOWED THAT THE ELECTRIC SPARK WAS LIKE LIGHTNING

Next came the experiments of Francis Hawksbee, who in 1705 was elected a member of the Royal Society. He made important experiments with mercury, showing that, when mercury is shaken in a glass tube from which the air has been partly drawn off, light is produced. And he made a simple machine for producing electricity by rubbing a glass cylinder with a piece of silk. He, for the first time, drew attention to the fact that the electric sparks which he was able to produce, and the crackling noise they made, resembled lightning. His son, Francis Hawksbee, who was born in 1687 and died in 1763, was a gifted maker of scientific instruments, and was the first man in London to lecture and at the same time make scientific experiments to illustrate his theories. The elder Hawksbee wrote much about his discoveries, and his books, translated into French and Italian, were of great assistance to scientists on the Continent.

All this may seem unimportant, but each of these little discoveries led to other and more important discoveries. A tree in a forest may not seem of much use as a dwelling for a man, but when the tree-feller and the carpenter and the builder have each done their share, that tree becomes an essential part of a house, all the parts of which have been pieced together, much like the building up of a great

AN ASTONISHING SIGHT OF LONG AGO



The extraordinary way in which Otto von Guericke proved the amazing power of a vacuum.

science. Now we come to some discoveries which bring us nearer to the practical uses of electricity.

Stephen Gray was a Bluecoat boy in London at the beginning of the eighteenth century, and by some happy chance gave up his life to the study of electricity. He made a notable discovery when he found that we can divide matter into two classes—that which can be electrified by friction and that which cannot be electrified by friction. Then he went a step further and found that the non-electrics could be made electric by being placed in contact with those which were already electrified. This means, as we should say now, that he had discovered that some substances are conductors of electricity and others are non-conductors of electricity.

THE BLUECOAT BOY WHO SENT ELECTRICITY ALONG A LINE OF THREAD

An ivory ball did not seem a promising thing with which to work, but Gray got a glass tube, and into its ends he fitted two corks. Into one cork he fixed his ivory ball, and, to his delight, he found that when the glass was rubbed it passed on its electricity through the cork to the ivory ball, and the ivory ball would now attract little light things just as the glass itself would. This led Gray to many splendid experiments—little in themselves, but dazzling by their results, considering how he was working in the dark. He tried to find whether silk would conduct electricity, and found that it would not. Then he tried pack-thread, and found that that did. He put up a line of pack-thread, suspended by means of loops of silk, which would not conduct the current away from the cotton. He was able to send a current of electricity along his line of thread for a distance of 886 feet. That was a very remarkable achievement.

THE DISCOVERY OF THE TWO KINDS OF ELECTRICITY

An industrious Frenchman was at work on similar lines at this time. This was a man named Du Fay, who, born in 1699, died when only forty years of age, in 1739, three years after Gray. Du Fay went over Gray's experiments, and went beyond them. He found that glass tubes could be used to hold up the pack-thread, and he found, too, that when he was in contact with the electric thread, he himself became electrified, and that when another person touched him there was a crackling sound, accompanied by a spark. But the

great thing which Du Fay did was to find out that there are two kinds of electricity, what we now call *positive* and *negative*.

HOW MEN'S KNOWLEDGE OF ELECTRICITY CONTINUED TO GROW

The two kinds exist in a substance, and are at rest until that body is rubbed. Thus two electrified silks will not come together, but silk and worsted will, though two electrified woolen threads will keep as far apart as possible. This is like the lodestone or magnet. That part of the lodestone which points to the north will drive away the north pole of another magnet, but will attract the other magnet's south pole, as if it loved it. North and south go together in the magnet, and opposite kinds go together in electricity.

Inventions now went forward rapidly. Machines were made for rubbing glass cylinders with cushions and other things, and they produced so much electricity that sparks could be formed which would set light to spirits, wax, pitch and other things which were thoroughly heated by friction. The increase of knowledge was now turned to account in a new way. Several men saw that, if electricity could be so easily produced in the open air, it ought to be still stronger if produced in a vessel, away from the free air, where it could be kept and tapped as required, instead of being allowed to escape. This was near the middle of the eighteenth century.

THE SHOCK THAT SURPRISED THE PROFESSOR WITH A JAR OF WATER

A monk named Cunæus, an inventor named von Kleist, and a professor named Musschenbræk, of Leyden in Holland, seem to have had each the same idea about the same time, and the outcome was what is called the Leyden jar. The professor electrified some water in a bottle, or jar, which was covered with a metal stopper, through the centre of which ran an iron rod. From this the electricity could be conducted as it was wanted. The professor made his discovery of the power of the electricity by accident. Holding the jar in one hand, he chanced to touch the iron rod with the other hand, and received such a shock that he declared that he would not for the crown of France risk experiencing such another.

The Leyden jar, though first made in Holland, was made perfect in England by Sir William Watson, another genius

SIR ISAAC NEWTON'S ELECTRICAL GAME



Sir Isaac Newton, using electrified rod and bits of paper, shows how the rod attracts the paper scraps.

of those early days. Watson was a poor tradesman's son, and was born in London in 1715. Apprenticed to a chemist, he loved science, and when he had made enough money to live on, he gave himself wholly to science. He improved the Leyden jar by covering it inside and out with tinfoil. This had important results. He used wires for carrying the current from one Leyden jar to another Leyden jar. Sending the current along the wire, he found that it gave a shock to the person holding the far end of the wire, two miles away, practically at the very instant at which it was released from the Leyden jar. This proved that the action of electricity is instantaneous—a most important thing, as it afterward proved in telegraphy. More wonders Sir William did with the mysterious force. He electrified a piece of ice, and with that set fire to spirits. He did the same with a drop of water which had been electrified. He fired the gunpowder in a gun with an electric spark, and showed many powers of electricity which had never before been suspected.

By this time the world was getting to know a great many things that electricity could be made to do, but men still knew nothing of its nature.

BENJAMIN FRANKLIN, WHO HELPED TO FIND ELECTRIC POWER

There was living in America one of the greatest men the world has seen, Benjamin Franklin, the man who first captured fire from the sky and brought it to the ground. He was born at Boston, Massachusetts, in 1706, and began his career, after very little schooling, in a small printing office of one of his brothers. He was very poor, but he had an extraordinary brain, and never troubled about being short of money. He educated himself entirely by his own efforts. He worked at his trade in New York, in Philadelphia and in London, and afterward set up in business for himself in Philadelphia. So famous did he become that he was chosen by his countrymen to go to England as their representative. War was about to break out between Great Britain and the American colonies, and he did all that he could to prevent it. Seeing that his efforts were hopeless, he returned to America, where he found that the war had already broken out. He was one of the committee appointed to draw up the Declaration of Independence, and then

was sent to France as ambassador to gain the support of that country against England. After all, he had the delight of opening the arrangements which led to peace between England and America. The last thing he did in public life was to make a prayer to the American Government against slavery in the United States. That prayer of his was not to be answered until after Franklin had been in the grave many a year.

So much for his public life. The more important thing for us here, however, is what he did with electricity.

HOW BENJAMIN FRANKLIN SENT UP A KITE TO BRING THE LIGHTNING DOWN

In the midst of all his work he had time to study and make experiments, so that he was honored all over the world for his knowledge about the tides and the weather, about colors, and, most of all, about electricity. He was one of the men who suspected that lightning and electricity are one and the same thing. But Franklin was not content to go on simply guessing; he put his belief to the proof. He made a kite of silk, and on the top of it he fixed a thin wire attached to the framework of cedar strips. He tied a string to the kite, and at the lower end he attached a silk ribbon (a non-conductor) to the string; next, where the string and ribbon joined he fixed a metal key. Then one day, when a thunderstorm broke over his home, he sent up his kite into a thundercloud, and, holding the ribbon end, stood waiting in a doorway.

He had printed a statement expressing the belief that everything that had been done with electricity was no more than was to be observed in lightning. Now had come the hour when he was to make his reputation as a scientist secure, or be laughed at by the whole world. He was very anxious as he stood and waited in the doorway with his son. The first thundercloud passed without any sign at all, and Franklin feared. A second came over the kite, and he now saw that little loose strands of the string stood out stiff and bristling. He put his finger toward them and they were attracted toward it. He placed his finger on the key, and instantly he felt a shock and saw an electric spark. Rain fell now, wetting the string of the kite, and electricity ran down the moistened string, and was so abundant that he was able to fill his Leyden jar from the key.

THE MAN WHO CAPTURED LIGHTNING



Benjamin Franklin was a young printer who educated himself and became so famous that when he died not only his own country, but also France, where he had been an ambassador, went into public mourning. Here we see Franklin experimenting with a kite, which he sent up into a thunderstorm to see if he could get an electric current from the storm down the string to the insulator which he held. He succeeded, thus proving electricity to be the same force as lightning. He first showed the value of lightning-conductors.

He had proved that lightning is electricity. He made other trials, and found that some clouds are charged with positive electricity and some with negative electricity, exactly in the same way as in the electricity produced by different bodies on earth. No sooner had he made sure of his facts than he set to work and built lightning-conductors. If lightning could be drawn from the skies, as his kite had shown that it could, then surely, he thought, it should be possible to guide into the ground the lightning which, if left to strike freely, might destroy the house. It was in 1752 that Franklin made his great discovery. He lived for thirty-eight years afterward, and when he died, in 1790, not only the whole of America but the whole of France, as well, went into public mourning for the famous old statesman.

Discovery was now well on the way to practical success, and every year added surprises. John Canton, an Englishman, who was born in 1718, became a schoolmaster, and invented valuable electrical instruments. He was the first man to manufacture powerful artificial magnets, and discovered that the air of a room can be electrified just like so many other things. Baccaria, a celebrated Italian, found that the air surrounding an electrified body itself becomes electrified. Then Robert Symmer made the amusing discovery that silk stockings and worsted stockings, when warmed and rubbed together, become so electrified that a Leyden jar can be filled with the current from them. More important was the work of Henry Cavendish, the grandson of the second Duke of Devonshire, born at Nice in 1731.

He was very rich, and very strange in his manner. He lived the life of a hermit in a beautiful London house. He hated the sight of strangers—not because he was an unkind man, but because he was so shy and modest. His women servants were never allowed to see him. If he had any orders for them he would write them down and leave a note on the hall table. Science was the great joy of his life. The chief thing that he did for electricity was to show that iron wire conducts electricity

400,000,000 times as well as water does. By the aid of electricity he exploded oxygen and hydrogen, and got pure water as the result. Cavendish lived until 1810, and in his time two men arose who quite changed the method of producing electricity. One was Luigi Galvani, who was born at Bologna, Italy, in 1737 and died there in 1798. The other, and greater, was Alessandro Volta, born in 1745 at Como, where he died in 1827.

Often, as you may have noticed, a very simple and natural circumstance suddenly becomes important because it sets someone on the trail of a far-reaching truth. Think of Sir Isaac Newton and his apple,

for instance. An old story tells that one day in the home of Galvani, who had become a professor of anatomy and had married the daughter of another professor, Signora Galvani was skinning frogs for soup. There was an electric machine in the same room; and, when a young assistant of Galvani, in passing, touched a nerve in a dead frog's leg with his scalpel, which had become electrified, the leg began to twitch and work convulsively. Galvani, upon his arrival, heard from his wife about the surprising thing that had occurred. This story may or may not be true. However, an insignificant little dead frog did become a valuable

link in the chain of electrical discovery. For Galvani, in experimenting with frogs' legs, determined to see whether lightning would have the same effect as a shock from the electric machine. While he was fixing some frogs' legs by copper hooks to the iron railing of his balcony, he saw the twitching renewed the moment the ends of the legs blew against the iron. Galvani declared that the electricity existed in the tissues of the frog. When Volta heard of this, he set to work to prove that the body of the frog did not contain the electricity. He argued that it was produced by the contact of two different metals, and he proved that he was right. He placed a disk of copper on his table, and on top of that he placed a piece of cloth which had been soaked in sulphuric acid and water. On top of that he placed



Henry Cavendish.

a disk of zinc. Next he added copper, cloth and zinc again, and so on, in that order, until he had built up a pile. It was a pile of pairs of zinc and copper disks, each pair having a moist piece of cloth between. Then he fastened a wire to the zinc disk at the top of the pile, and a second wire to the copper disk at the bottom of the pile.

ALESSANDRO VOLTA, THE MAN WHO MADE POSSIBLE THE ELECTRIC BELL

Volta put the free ends of the two wires together, then separated them. As they were drawn apart, the electric current which had been set up in the pile caused a spark at the ends of the wires. Here, then, was the first instance of the manufacture of electricity by chemical action.

It was easy soon to improve on the Voltaic pile. Instead of placing the disks and cloths on the table, where the moisture quickly dried up, he put the pile into a jar, or cell, filled with the water and acid. That was the Voltaic cell, which to this day is used for producing electricity by chemical action. This invention belongs to the year 1800, but more than a century afterward we still sometimes use the Voltaic cell as the battery for our electric bells, and all manner of other things.

This invention caused much excitement, and set men still harder to work. They found now that they could produce electricity in this way as they liked, and cause it to flow in a steady current over wires, not letting it fly away immediately after it was created, as it did from amber and other things. They found, among other things, that the current would heat wires, and this led at once to Sir Humphry Davy's discovery of the electric flame from which we get electric light, as we read on page 993.

THE DANISH PROFESSOR WHO TURNED THE COMPASS FROM THE NORTH

Now we must think for a moment of magnets. They had long been made. Soft iron could be magnetized by rubbing the lodestone upon it, but magnets like these soon lost their magnetism. Steel, after being magnetized by the lodestone, does not lose its magnetism. Once a magnet, always a magnet, with the hard steel. Now, many clever men had been wondering if there might not be some connection between magnetism and electricity, and Professor Oersted, a Danish scientist living at Copenhagen, found in

1819 that by passing an electric current from a Voltaic battery through a wire he could alter the position of the magnetic needle. The magnetic needle is the little steel pointer of the compass which, when not interfered with, points to the north. Oersted found that, though the whole earth is one vast magnet, its power to attract the magnetic needle to the north is not great enough to prevent the point of the needle from being drawn aside by a strong electric current. Oersted showed that when the wire bearing the electric current is placed over the needle, the needle turns its head from the north to the east, but that if the wire be placed underneath the needle, the needle turns its head to the west.

What Oersted did sounds an interesting trick for a conjurer to do, but see what the effect of it was. The fact that an electric current turns the magnet is the beginning of the power which enables us to have telegraphs and telephones, and to do all the work of which the marvelous electric current is capable. Oersted had opened the door to the great field of discovery in what we call electromagnetism. But the scientists did not stand still in the doorway, or the opening would have been of no use to mankind.

THE BLACKSMITH'S SON WHO HELPED TO CHANGE THE WORLD

It remained for one of the finest English sons of science to carry the work to perfection. This was Michael Faraday, who was born in 1791, the son of a poor London blacksmith. After very little schooling he was apprenticed to a book-binder; then, after working hard all day, he would study science at night. One day a gentleman, on entering the shop, found the boy at work binding an encyclopædia, and studying hard at the article in it on electricity.

The gentleman was surprised to see a boy so interested in a subject of such difficulty, and questioned him. He found that Faraday, working late at night, had already been making experiments of his own, though he was too poor to possess anything but a home-made battery. The visitor was so pleased that he gave him four tickets for the lectures which Sir Humphry Davy was then delivering at the Royal Institution. Faraday was as much delighted as if someone had given him a fortune. He went to the lectures.

Entranced by Davy's learning and

powers of exposition, he felt himself an ugly duckling, craving what seemed an impossible change. He made careful summaries and observations on the lectures, wrote them out neatly, and sent them to Davy, accompanied by a petition that he might serve the lecturer.

THE KNOCK AT THE DOOR THAT FARADAY HEARD IN BED

Would that timid knock at the portals of fame be heard? Yes, said Hope. No, said Probability. But late one night, as Michael was getting into his garret bed, a loud knock at the street door was heard, and in came a liveried servant of Humphry Davy, bidding the youth wait upon Sir Humphry in the morning.

The end of it was that Davy, remembering his own early days, and correctly analyzing the character of his visitor, warned him of the hardships of the career he aspired to follow, and ended by engaging him. He engaged him as his assistant at twenty-five shillings a week.

The co-operation of the two men was perfect. Faraday soon came to assist his senior in his experiments and lectures, and he carried Davy's work farther than it would have gone without his assistance. There was nothing he took up that he did not advance and improve.

Sometimes Sir Humphry Davy would take the industrious apprentice abroad with him; and Lady Davy, not seeing the genius in the awkward youngster, behaved meanly to him, emphasizing the fact that he was to act as valet as well as secretary to her distinguished husband, and even making him take his meals with the grooms. But Faraday bore all this with patient and uncomplaining dignity, and at the Royal Institution, where he eventually succeeded Sir Humphry, he immortalized himself with discoveries which made him the equal of the mightiest.

We have seen that Oersted found a magnet to be affected by a current of electricity passing through a wire, but Faraday made a greater discovery. He found that wire, moved quickly in the neighborhood of a magnet, becomes electrified by the magnet; that the current is stronger at the moment of the wire's entering and leaving the field of magnetic force; and that the current flows alternately from one end of the wire and then from the opposite end.

"What is the use of such knowledge?" a lady asked him, as she saw

him performing his historic experiment. "Madam," he said, "what is the use of a new-born child?"

The revelation thus simply made was that of Faraday's new-born child of science. Fix the coil of wire between the two poles of a magnet, make it revolve, lead away the current thus generated and we have the electric dynamo. By the dynamo we have current for the telegraph and the telephone, the ship, the submarine, the airplane, the motor car, the tram, the train, the lighting of our streets and houses; for the waves on which wireless speech is borne around the world, and for the motive power by which the machinery of the world is driven.

Never was there a more fruitful life, never one more beautiful. Faraday was marvelously delicate and accurate in his experiments, all with home-made apparatus. When some desperate and dangerous experiment began to turn as he wished, he would rock from foot to foot in his joy, rubbing his hands and humming a tune.

HOW STURGEON AND HENRY IMPROVED THE ELECTROMAGNET

William Sturgeon in 1825 made an electromagnet of the highest value. He found that if he took a horseshoe-shaped piece of soft iron and coated it with varnish to insulate it, then wrapped around it a spiral coil of copper wire whose turns did not touch one another, the iron became a powerful magnet when an electric current was passed through the wire. Such a magnet was more powerful than an ordinary one, and could be made a magnet or not a magnet, as often as the current was turned on or off.

Another experimenter, Joseph Henry, born at Albany, New York, in 1799, found a still better way of making electromagnets. He insulated the wire itself by winding it with silk, then wrapped it in many coils upon the iron horseshoe. By making certain variations in constructing and connecting his coils, he could produce a "quantity magnet," whose lifting power was very great, or an "intensity magnet," whose force could be felt and used a great distance away. At Princeton, where he was a professor, Henry made a magnet which, with the current from a very small battery, was able to lift three thousand pounds. He did more than any other American to advance the development of electrical science.

The greatest part of the foundation of this science had now been laid, and the work of applying it went on without a break. For this, machinery must be made; and many have been the heads and hands devoted to work out the uses of the marvelous force. There seems to be no limit to the wonders that can be performed with its aid.

The electric telegraph was the first use to which electricity was put. Long before the invention of the telephone and before anyone so much as thought that trains or boats could be driven by electricity, our fathers were familiar with the fact that messages could be flashed over the wires stretched along the country road, and children held their ears to the tall poles to listen to the vibration of the wind through the wires. They thought it was the song of the messages, as they sped upon their way. Many men gave the best powers of their mind to the invention and improvement of telegraph instruments, but these men have a place for themselves in the story of telegraphs and telephones.



Michael Faraday in the streets of London.

electrician, he was a great mathematician, and it is in his mathematics that our interest in him lies.

When Michael Faraday was working out the relationship between magnetism and electricity, he knew that he had to do with what he called a "field of force," and Joseph Henry found that when he made experiments in one part of his house, his instruments in another part of the house were affected by the electricity. Neither of them was able to go any further into that side of the problem of the great power with which they were

dealing, but Clerk Maxwell attacked it with the help of mathematics, and solved it. He said that electricity causes waves in the ether, which fills all space, and that light and heat are caused by waves of the same sort, which penetrate all matter. This is the electromagnetic theory about which we read under Light.

Clerk Maxwell wrote a very learned book to set out his theory, but he went no further into the matter, and he died in the year 1879. Some years later the subject was taken up by another scientist.

A MAN WHO WORKED OUT A GREAT THEORY BY MATHEMATICS

The next great student of electricity with whom we have to do is James Clerk Maxwell, a Scotchman, born in Edinburgh in 1831. He did so well at school that he had reached the university at an age when most boys are ready only for the high school, and at fifteen was known as a genius who had already written on scientific subjects. From Edinburgh University he went to the University of Cambridge, where he also made himself a name, and was afterward professor successively at a college in Aberdeen, at King's College in London and at Cambridge University. Besides being a great

A NOTHER SCIENTIST WHO WORKED ON CLERK MAXWELL'S THEORY

Heinrich Rudolph Hertz, a native of the free city of Hamburg, was born in the year 1857. When he was about twenty, Hertz went to the University of Munich to learn to be an engineer; but fortunately for the world he changed his mind, and went to the University of Berlin to study science. He quickly made a name for himself in his chosen subject, and when he was twenty-three, he took his doctor's degree with honors. He then became an assistant to one of his old professors in Berlin, continuing his researches. About three years afterward he went to the University of Kiel as instructor.

A MAN WHOSE NAME WAS GIVEN TO THE ELECTRIC WAVES

While he was at Kiel he went deeply into Clerk Maxwell's wave theory of light and electricity, and made many experiments in an effort to prove its truth. He was entirely successful. With the simplest of instruments he detected the electric waves in the ether. He measured their speed and found that they have the same quickness, or velocity in space, as the waves of light. His great work astonished the world, and the electric waves were named Hertzian waves in his honor. After this he was made a professor at the University of Bonn, where he made his last experiments and wrote his last book, for it was there he died, in the year 1894.

Hertz knew that he had done a great work for science, but he never knew its importance to the practical, everyday life of the world, and in a few years his fame was overshadowed by that of Guglielmo Marconi, a young Italian, who is now famous through all the world as the man who gave us the wonders of the wireless telegraph. We may read more of him in *The Makers of the Telegraph*.

THE MAN WHO DISCOVERED THAT ATOMS CAN BE DIVIDED

The last man of whom we shall speak in this part of our story is Sir Joseph Thomson, who discovered the existence of the wonderful electrons, of which the atoms are built up. He was born in 1856 near Manchester, in England, and as a youth attended Owens College in Manchester, and from that institution he went to Cambridge, where, like Clerk Maxwell, he made a name in mathematics. He afterward became a professor at Cambridge University and at the Royal Institution in London. In the research laboratory which he developed at Cambridge he and other scientific workers from many parts of the world gave especial study to the action of electricity through gases. During a visit to the United States in 1896 he gave a series of lectures at Princeton University on this subject. In 1919 Sir Joseph was given a professorship in the Cavendish Laboratory. Many honors have come to him in recognition of his distinguished work, among them the Nobel prize for physics in 1906.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 1361.



William Gilbert shows Queen Elizabeth an experiment in electricity.



THE ARAB PATRIOT OF ALGERIA

AB D-EL-KADER, whose name means "servant of the mighty God," was an Arab of Algeria, born in 1807. He was a man of remarkable character. With a fine and graceful figure, and a body of great strength and endurance, he was unsurpassed in courage, profoundly learned, and had high standards of duty and honor. He had, too, a powerful influence for good over all with whom he came in contact. When a young man of twenty-six, he left his life of study and religious meditation to lead his people, as sultan, against the French invaders, and for fourteen years he tried to free Algeria from the foreign yoke and form a great Arab nation.

Alone, or with a few horsemen, he would appear in a remote part of the Atlas Mountains or in the Sahara, and rally thousands to him. When the French anticipated an attack in their rear, he would suddenly appear in front, as we see in the picture. He could shoot accurately while standing in the saddle, with his black Arab horse speeding like lightning; or he would enter a town and harangue the townsfolk into defense of their country and religion. He treated his prisoners as guests, sending them money, clothes and food. Formerly Arabs had killed their prisoners. Some women were once captured and brought to him, and as he set them free he exclaimed

CONTINUED FROM 1037



in anger: "Lions attack strong animals; jackals fall upon the weak."

Often Abd-el-Kader and his brave followers had insufficient food or galloped for days together over the desert sands.

Once when they were living on acorns, a stray sheep was brought to the leader. "Take it to my starving soldiers," said he.

But the resources of France were limitless, and though many armies were sent in vain, 100,000 disciplined troops in the end overcame the little remnant of the Arab forces. Even then, when Abd-el-Kader wandered with hardly a follower, such was the terror of his name that the French had to keep a large army on foot.

Not until his cause was utterly hopeless, in 1847, did this brave man surrender on condition that he and his family should be free to live in Alexandria or St. Jean d'Acre. That promise was not fulfilled, for he was kept a patient prisoner in France for many years. It was not until 1852 that France, under Louis Napoleon, redeemed her pledge, and Abd-el-Kader was set free.

In 1860 a Turkish mob rose against the Christians of Damascus, where Abd-el-Kader was then living. With some Algerian soldiers he saved the lives of 15,000 people, and from that time honors and distinctions were heaped upon him, until his death.

THE BOY WHO TOOK A MAN'S PLACE

ABOUT 150 years ago a young boy who was ready to make a start in life was apprenticed by his friends to the captain of a Scottish coasting vessel, and although in those days the seaman's life was a very hard and perilous one, the boy had sufficient liking for the sea to throw himself with all his heart into his duties.

But storms and tempests were not the only risks to which the seamen of those days were subjected. There was the press-gang, which might seize on a man and put him on a ship that was leaving England perhaps for years.

Life in the navy was so full of brutalities and hardships that it was most unattractive, and sufficient men could not be obtained by ordinary recruiting to man the vessels of war. The press-gang was therefore set to work, and bands of ruffians used to raid a vessel or a town, seize any likely man, and carry him off to a warship, quite regardless of the fact that he might have a wife and children or an aged mother dependent upon him.

The coasting vessel on which the young apprentice sailed was visited by the press-gang in this way, and every man on board, with the exception of himself and the captain, was seized for war service. The mate had a wife and young family, and his distress at being dragged away, per-

haps never again to see them, was so pathetic that the apprentice felt the greatest sympathy for him, and offered his own services if the mate could be released.

The head of the press-gang, an officer of the king, readily fell in with the suggestion, saying: "Ay, my lad. I would sooner, any day, have a likely boy with some spirit in him than a blubbery man. Come along with me."

The boy went, and the circumstances under which his services had been obtained were related to the commander of the warship, who was so pleased with the spirit and kindness of the lad that he at once promoted him to be a midshipman. The lad did his work splendidly and took the greatest pains to learn his duties, so that promotion followed promotion in rapid succession.

Later he obtained command of a small vessel of his own, and was soon advanced to a larger one. At last that ambition of every keen midshipman—to be an admiral of the British Navy—was fulfilled, and the young apprentice who had sacrificed his own interests and comfort for the sake of the mate and his family became Vice-Admiral Campbell, whose name is greatly honored in the annals of the British Navy. He died in the year 1790.

A BAND OF NOBLE MEN

WHEN Napoleon was forced to retreat from Moscow because the city was in flames, he fled with the remnants of his army across the bleak, snow-covered plains of Russia, with the enemy's army in pursuit. It was a terrible march. The hungry, sleepy, frost-bitten men—French, Italians, Germans and Poles, soldiers from the countries subjugated by the ambitious Napoleon—were scarcely able to crawl along; yet they were urged forward by dread of the Cossacks in pursuit.

Among the Germans was Prince Emilius of Hesse Darmstadt, heading his little band of ten, all that remained of the thousand men he had led eastward a few weeks before. As night came on, they stumbled upon a burned hut standing out in the dark. Then the Prince Emilius, turning to his men, said:

"Dear brothers, we must rest here, trusting to Heaven that, whether we wake again on earth or not, all is well if we have faithfully borne our part in the toil and suffering."

And so they lay down in the ruins of the hut, and Prince Emilius was soon dreaming happy dreams in which he saw kind faces bending over him.

At last he woke with a start, warm and rested, wondering where he was. Then he remembered the dreary march, the snow, the hunger and the misery. He looked about the burned hut, but no one was there. Then he discovered that he had been sleeping beneath a pile of garments which he recognized as those of his soldiers. And as the daylight increased, he saw that the doorway was blocked up with the bodies of his noble men, who to save his life had sacrificed their own.

THE GIRL WHO SOLD HER HAIR

AT the time when Napoleon was trying to conquer all Europe, and state after state was falling a prey to his grasping ambition, Silesia, a German territory, was doing her best to beat back his invading armies. Everyone in that freedom-loving state was wrought up to a passion of ardent patriotism in the terrible year of 1813, giving all he could to the cost of equipping an army for defense.

There was a Silesian girl who had no fortune to put at the service of her country. Her small possessions were of hardly any value, yet she burned with eagerness to help her countrymen in their fight against the invader.

One day the idea came to her that she might sell her thick, long hair, and so obtain some money. She accordingly set off to Breslau, where she sought out

a hairdresser, and offered him her tresses. He could not understand why she should want to part with her beautiful hair, so she had to tell him the reason. Then he agreed to cut off her hair, but he could not afford to give more than two dollars for it. The bargain was made, the hair was cut off, and the girl returned to her home.

The hairdresser was so touched with this instance of self-sacrifice that he would not part with the hair in the usual way, but used it in making various ornaments such as bracelets. The story of what this Silesian maiden did for her country became known. All Silesia was proud of the act, and articles made of her hair were eagerly bought. So much were they in demand that the hairdresser reaped a golden harvest, and contributed a large sum to the state.

A PRINCE WHO GAVE UP HIS FREEDOM

IN the Middle Ages, Ceuta, which lies just opposite Gibraltar, on the north-west coast of Africa, was a hot-bed of piracy; and King João of Portugal and his sons made an expedition to it, captured it, and released the Christians imprisoned there. Eighteen years later, in 1433, King João died, and soon after two of his younger sons, Henrique and Fernando, laid siege to Tangier, a town farther along the coast.

But the Moors, with their allies, surrounded and entrapped the little army. As they were unable to reach their boats and had no food, they were forced to give to the Moors a hostage for the delivery of Ceuta. Prince Fernando offered himself, and then his brother had to leave him. Their elder brother, the King of Portugal, sent a fleet to Ceuta; but nothing was done, and Prince Fernando remained a prisoner.

Soon the Moors were angered that no ransom was sent, and that Ceuta was not yielded to them; so in revenge they maltreated and starved the prince. Now, his mother was Philippa, the daughter of John of Gaunt of England, who had brought up her son to be a man worthy of his knighthood. So Prince Fernando bore his troubles patiently, enduring all in order that Ceuta might remain in the hands of his Christian countrymen. The

king, his brother, tried to raise an army to free him, but he caught the plague by which Portugal at that time was being desolated, and died from it. His little child, aged six, became king, and quarrels disturbed the land. Thus, as the years passed by, hope of release for the patient Prince Fernando grew less and less bright.

Two kings in Spain, at last, planned to attack Tangier and release him; but that only led to his being sent to the King of Fez inland. He put the prince first in a dungeon without light or ventilation, and then made him labor among Christian slaves. But Fernando was so kind to them, and behaved so nobly that even the King of Fez expressed admiration for him.

After ten years in prison for the honor of his country, brave Prince Fernando died. The Portuguese hold his memory very dear and call him Prince Constant. The poet Calderon, too, wrote a great play and made him the hero of it. And though his life was seemingly offered in vain, Ceuta has ever since belonged to the Christians; for when it ceased to belong to Portugal it passed into the possession of the Spaniards. Thus, what Prince Fernando gave his life for was really accomplished—the rule of a Christian prince at Ceuta.

THE NEXT STORY OF GOLDEN DEEDS IS ON PAGE 1731.

THE LARGEST WILD ANIMALS IN BRITAIN



This is the famous picture of wild cattle by Sir Edwin Landseer, the celebrated painter of animals. There are in England some of the old wild cattle, which are as wild and as savage as the cattle of thousands of years ago were. They hide among the trees during the daytime and come out to feed at night. If you go near, they will either run away or attack you. They now live in only a few places.

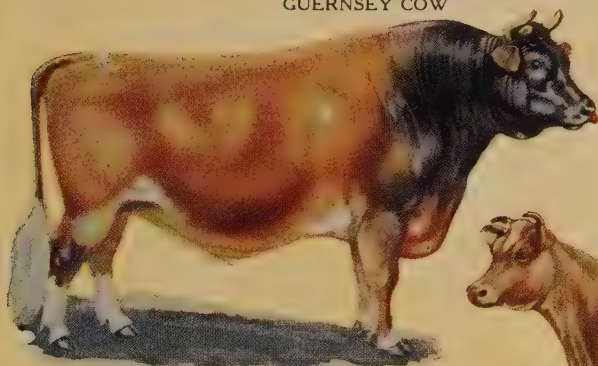
SOME FAMOUS DAIRY BREEDS



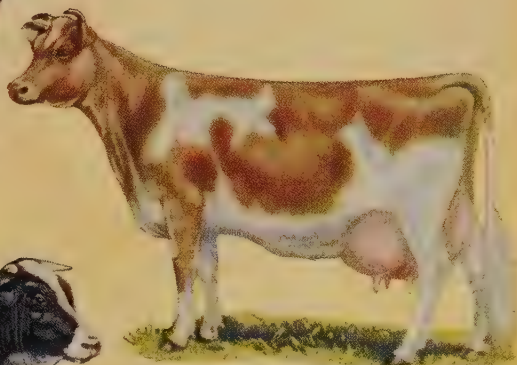
GUERNSEY COW



GUERNSEY BULL



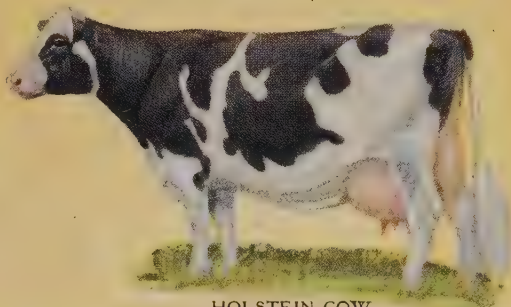
JERSEY BULL



JERSEY COW



HOLSTEIN BULL

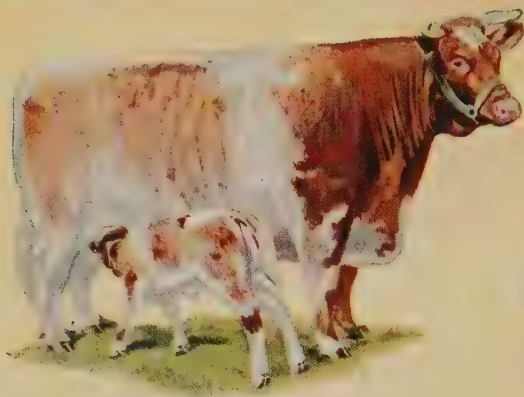


HOLSTEIN COW

Cattle are divided into beef and dairy breeds. Guernseys and Jerseys came from the islands of the same names, in the English Channel, between England and France, but are now found everywhere. Their milk is very rich. Holsteins, or Holstein-Friesians, much larger cattle, originated in the Netherlands. They give more milk, but it is not so rich as that of some other breeds.

Pictures by courtesy of The Field.

BREEDS ORIGINATING IN GREAT BRITAIN



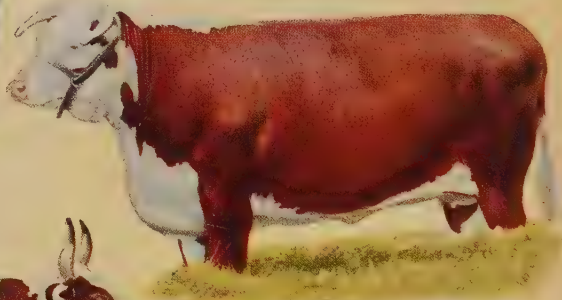
SHORTHORN COW AND CALF



SHORTHORN BULL



ABERDEEN-ANGUS



HEREFORD



AYRSHIRE BULL



AYRSHIRE COW

These are chiefly beef cattle and all were developed in Great Britain, though some of the best specimens are now bred in Canada and the United States. Some families of Shorthorns are good milkers. The Aberdeen-Angus and the Herefords furnish excellent beef. The Ayrshire, one of the best dairy breeds, originated in Scotland.

Pictures by courtesy of The Field.



A herd of bison on a reserve in Canada.

THE GREAT CATTLE FAMILY

WHILE this chapter is being written an appeal is issued by learned men to all travelers in far, strange lands to seek out new foods, new fibres and new drugs. They are asked to find and report anything which may help to increase the common possessions of mankind.

Though the voice of science is now heard, for ages it was the voice of nature which urged men on. It urged them to try to use the resources of the animal world to make their lot easier. The response to that voice was one of the first triumphs of mind over matter. It was the victory of a feeble upright mammal over brutes fierce enough to rend and devour him, swift enough to outrun him, strong enough to crush him.

The greatest task of all had yet to be faced. Men had to grapple with the most powerful order on earth—the mammals with hoofs, and many of them with formidable horns. Early, unknown men did it. They mastered the elephant, the camel, the horse; they tamed the dog, the pig and cattle.

How the conquest began we can only guess. Even to-day, after thousands of years of domestication, a bull sometimes gores a man to death, or spreads panic through a town in which it breaks loose; a horse sometimes at-



tacks its groom; an elephant tramples down a village and kills all upon whom

it can use its trunk. When we read of commonplace events such as these, we can begin to imagine something of the nature

of the contest when first misty-minded savages decided upon the captivity of the giants of the earth.

We cannot stop to tell of all the great wonders flowing from that old conquest. In this story we shall limit ourselves to the story of the cattle. With these began man's first advance beyond the crudest savagery. Going naked into the wilds with his dog, he captured the parents of man's future herds, and brought back to his family food, drink, raiment, power; flesh, milk, leather, and strength to bear burdens and to haul loads.

The cow is worshiped as a sacred animal in India; all civilization owes it gratitude as the foundation of human progress. At one bound the first tamers of cattle passed from a condition of wandering savagery to the possession of property. No longer, after that, need men, women and children creep like wolves in the tracks of wild beasts to secure food. They domesticated the giants and formed homes around their pastures. The law of property came into being. Before the Tenth Commandment was handed down, some

form of the rule "Thou shalt not covet thy neighbor's ox" must have been among the first of laws on which mankind built up its earliest moral code.

In other ways the results were of immediate importance. No longer did the illness of a mother involve the death of her baby. Milk from the cow took the place of nourishment which the stricken parent was unable to furnish.

The slaughter of babies is one of the oldest crimes known to man. It has been practiced in all ages, in all societies, and is a scourge to-day among tribes which do not possess cattle. The loss of cattle in France, Belgium and the Balkans was one of the disastrous consequences of the World War. In Russia the destruction of the herds was one of the chief factors in a famine of almost unparalleled horror.

THE LITTLE MEN WITH FLINT TOOLS WHO FIRST MASTERED CATTLE

At a blow food for babies and invalids vanished, with meat for the robust and leather for the boots and shoes of all. Death from starvation and cold was the necessary consequence of the passing of Russia's cattle. Other countries were saved from dangers as terrible by the effort of many nations in sending cows and oxen to replace those which had been destroyed during the war.

These facts help us to realize how very different human history must have been had not these early savages risked life and limb to win service from the order of animals which includes the last of earth's surviving giants.

The cattle-tamers ceased to be homeless wanderers. Each man could, if he would, become what is now an impossible political dream, the owner of "three acres and a cow"; and with the first of dairies came a new food, so that babies and invalids need no longer perish for lack of proper nourishment.

Our ancestors in Europe had not far to go in quest of their cattle. The towering aurochs roamed the grassy plains and browsed in the thick forests. With the aurochs all domestic herds began.

They were here before man—their bones in the soil prove that. The little men with flint tools must have been their first masters in Britain. The Celts, who came later, had them in domestication when the Romans arrived. The Romans brought their own breeds descended from the same source, and later Anglo-Saxons

introduced their own results of long ages of breeding from the aurochs.

Wild cattle still existed in Eastern Europe, few but precious relics, until the World War. At that time, unless unsuspected groups had previously managed to hide themselves in remote mountains, valleys or far forests, the last of them vanished. They, however, were not aurochs, but bison.

THE CATTLE THAT ROAMED THE FORESTS WHERE CITIES NOW STAND

There are so-called wild cattle in Great Britain, which are the nearest approach to a pure descent from the aurochs now to be found. They are not like their colossal forefathers. Centuries ago, when cattle roamed the land in semi-wildness, the blood of all the three strains already named became mixed, and we got another type of animal as the result.

They lived in the great forests by which London and other centres of population were surrounded. When the forests were cleared and land was inclosed for private ownership, these animals were shut up within walls and fences in parks. It does honor to certain of the old families of England that these animals have been so long preserved.

The best-known to-day is the Chillingham herd, white with curly hair, with red above the muzzles and the inside of the ears. They are still very much like the ancient free stock. They are very shy and do not become tame. They do not like the presence of human beings, and they keep the habit of feeding by night and hiding by day.

THE CATTLE THAT WERE HIDDEN DOWN A MINE FOR SAFETY

Many herds have been dispersed, but the survivors have been guarded with loving care. Once, during an epidemic of foot-and-mouth disease, the Duke of Hamilton had his herd all taken down his Lanarkshire coal-mines and safely tended there until the danger was gone.

In ancient days our forefathers in Europe used the ox as a beast of burden. All work on the land was done by cattle. It cost a few cents for a man and his oxen to plow an acre of land and less for women to hoe it. Oxen were preferred to horses as being only one-third as costly to keep.

Cattle were always scarce, for a reason which seems strange to-day. There was little winter food. So every November all but laboring cattle and a few for dairy

THE GREAT CATTLE FAMILY

and stock were slaughtered and salted for the baron's winter sustenance.

Yet, poor as they were, cattle even then were grouped in breeds, though quite unimproved breeds, but nearly as fine animals as could be found in the wilds. When our forefathers came across the

ox-teams. The roads were so bad that no load could be drawn by fewer than twenty-four oxen. So Ballarat's main thoroughfare was planned with a view to a train of at least twenty-four oxen turning round in it.

More and more, however, we think of



A rare sight in this country—plowing with the aid of an ox-team.



An Indian farmer and his ox.



A cement-mill in India worked by oxen.



A team of sixteen oxen hauling timber in New South Wales.

HOW THE OX WORKS FOR MAN

seas, they brought cattle with them, and much work was done by oxen. Even yet, men still plow and haul with ox-teams in some sections of our country.

Many a large city has grown to greatness on the labor of cattle. Ballarat, in Australia, once the centre of a great gold-mining industry, has a main street among the widest in the world.

In the early days all goods were carried up from the coast to Ballarat by

cattle only as the providers of milk, butter, cheese, food and leather.

There were no cattle in America when the white men came. The great herds which used to roam the western plains were descended from the Spanish cattle which escaped, and the same is true of the droves of wild horses. The fine cattle now to be found in Canada and the United States are descended from animals brought from Europe, chiefly from the

British Isles. Occasionally fine specimens are still imported.

Cattle are generally divided into beef breeds and dairy breeds. The chief beef breeds originated in Great Britain and take their names from the districts in which they are developed. Man can do wonderful things with animals by selecting specimens which have the qualities he desires and breeding from them. The best animals in every generation are selected for breeding, and soon all, or nearly all, in every generation, will have the qualities desired.

THE GREAT BEEF BREEDS COMING FROM ENGLAND

One of the most popular beef breeds is the Shorthorn, or Durham, which was much improved in the county of Durham. They are immense creatures, usually red or white, or with these colors combined, and have been carried to every part of the world. Most Shorthorns give little milk, but some families have been bred to give milk as well as to furnish beef.

The Herefords also originated in England. They are red with white face, chest and mane, and there is more or less white on the lower part of the body and on the legs. They are popular on the great ranches, and there are perhaps more of them in the West than there are of any other breed. They give little milk.

The Aberdeen-Angus come from Scotland. They are black cattle without horns, and make excellent beef. The Galloways are also a Scotch breed, and are likewise black and hornless. Their legs are shorter and their hair is longer than the Aberdeen-Angus. They are very hardy.

The Devons are another English breed, generally a little smaller than the others we have mentioned. They are a rich red in color, and some of them give a considerable quantity of milk. No cattle are more beautiful.

Many specimens of these beef breeds weigh more than a ton. The dairy breeds are generally smaller, though one of them is quite large. It came, not from England, but from the Netherlands. This is the Holstein, or the Holstein-Friesian, as it is sometimes called. The cows give great quantities of milk, but it is not so rich in butter-fat as that of some other breeds. If a dairyman sells milk, he is likely to have many Holsteins in his herd. If he sells butter, he chooses another breed.

THE WONDERFUL CATTLE FROM THE CHANNEL ISLES

Between Great Britain and France are the tiny Channel Isles. From them came two of the best breeds of dairy cattle. The Jerseys are small, graceful cattle of several colors: gray, fawn, tan, brown and black. They do not give so much milk as the Holsteins, but it is very rich in butter-fat. The Guernseys are larger than the Jerseys, and give more milk, which is also rich in butter-fat. They are yellowish brown in color with patches of white.

Probably the Jerseys and Guernseys came originally from France. The early French settlers in Canada took cattle with them, and a breed known as French-Canadian has been developed. They resemble the Jerseys in general form, but can stand more hardships.

The Ayrshire is a Scotch breed, white and brownish red in color. In size and in quantity and richness of milk they rank between the Jersey and the Holstein.

There are a few cattle of other breeds in America. The Brown Swiss is much liked by some, and the Dutch Belted has good friends. This is a black animal smaller than the Holstein, with a broad band of white around it. The Kerry comes from Ireland. They are small, graceful black cattle, can endure much hardship, and are good milkers. The Dexters are tiny cattle descended from the mountain Kerry, but are good milkers. They are the bantams of the cattle family.

THE CATTLE THAT ARE BELIEVED TO HAVE COME FROM AFRICA

Cattle-taming has not been the exclusive work of Europe, though America had only bison, and Australasia none of the order. India has taken her humped cattle from wild stock called zebu, but the Hissar animals of the Northwest provinces have not only the humped shoulders, but long, drooping ears. In Gujerat we find similar animals but smaller. The cattle of Mysore are distinguished by backward-curving horns, which in aged animals develop fantastic but characteristic twists.

The Gaini cattle of India are tiny dots. The adult bulls do not exceed thirty-six inches at the shoulder. The humped breed of domestic cattle can be traced through China, Africa and Madagascar, and all are believed to have set out originally from the African continent.

THE LORDLY CREATURE THAT INDIA HAS NEVER TAMED OR MASTERED

In northeastern Africa cattle called sunga, or Galla oxen, have immensely thick and ponderous horns; and their nearest relatives, the Nuar cattle, are the toiling servants of the Egyptian Sudan. Moshi, Hausa, Damara and Bechuana-land are other famous breeds in local areas of Africa; and of the Bechuanaland species Darwin mentions one whose horns were over thirteen feet from tip to tip.

How is it that India, with her tamed zebus and her buffaloes, has never mastered the lordly gaur? This is the monarch of the cattle, six feet high at the shoulder—four inches higher than a stalwart horse. It is a majestic animal, herding in small numbers, generally from two to five thousand feet up the mountains. To-day it is as fierce and untamed as when India's ancient civilization first came into being.

But has the mighty gaur contributed nothing to mankind's uplifting? A very powerful domestic animal is the gayal. Though smaller than the Titan of the hills, it is so gaur-like in general features as to cause naturalists to regard it as simply a Malayan species of gaur, yoked for a limited sort of service.

UP FROM THE HEAT OF INDIA TO THE SNOWY MOUNTAIN HEIGHTS

It has never accepted labor—never—but submits to captivity, in which it yields milk and its products, and, in due course, flesh and leather. It is a wonderful climber, and in rock-strewn ways its activity suggests what goats might do were they gayal-sized.

The bantin, or Javan ox, is related to domestic life in the same way as the gayal. It is herded, not worked, though it is a huge, powerful animal. Singapore beef is, in the main, the flesh of this half-wild Javan ox.

Up from the heat of India to the dizzy plateaus of Tibet and China, Mount Everest still rears her snowy crown unconquered. At heights where Europeans could not long live in health is the yak, the Tibetans' packhorse.

In one of the dreariest parts of the world, twenty thousand feet high, this strange beast is happy. It is generally heavily horned, though with hornless examples; clad with rough, ragged hair, short-legged, sharp-hoofed, sturdy, three times the weight of an ordinary ox.

Wild or domesticated yaks can endure the most frigid cold, but not heat. That is fatal to them. And because they are creatures of the hills and consume mountain verdure, they cannot be induced to eat grain. Yet they are the motive power of the Tibetans. Their strength in bearing burdens, their skill in crossing glaciers, their bold contempt for icy rivers make them as useful for the Himalayas as camels are for the desert.

THE AMAZING STORY OF AMERICA'S WILD CATTLE

All the species with which we have so far dealt have safe places in life. Either they are under man's care or they have their habitations where he does not seek to drive railways or raise cities in the wilderness. How different has been the story of the American bison! These were America's only wild cattle. They roamed the prairies in herds numbering millions. The plains are still worn deep where century after century they followed the same migration routes from place to place. They were meat and clothing to the Indians for ages.

White men arrived, and but little harm was done until the human tide swept westward. Trains of emigrants lived on buffalo-meat as they toiled along to the virgin West. Then came the building of railways and an intensive campaign of slaughter. The noble monarchs of the prairies went down before the white men's guns like ninepins before a player. With the exception of fur-bearing seals no mammals of bulk have ever been slaughtered in such appalling numbers as the American bison. In part the object was food and leather, in part it was savage, wanton destruction.

The bison disappeared almost as completely as the passenger-pigeon was later to do. A few years ago the bison was almost extinct. A few were left, however, in private hands. The Indians had kept a few bison calves as pets. They wisely let white missionaries have them. The calves grew up and multiplied. Other small isolated groups were found. All were treasured now like gold, for a dreadful disaster had to be averted.

THE SAVING OF THE BISON ON THE POINT OF EXTERMINATION

The Canadian Government took over the care of the herds in the dominion—more than half of all alive. The animals were placed on huge ranges safe from

persecution. They have increased in the old way. Little herds have become big herds, running at last into thousands. It is reported that a full herd, a thousand strong, has been discovered by a Canadian government official along the icy Mackenzie River. If this is so, all the more cause for rejoicing.

In the United States there are many in the Yellowstone National Park, and there are now small herds in several zoölogical gardens. In New York City there are two groups. A few rich men have bison on their lands. In 1922 Canada presented two to the London zoo, where Europeans may see these former monarchs of the American prairies.

Americans call their bison the buffalo, but it is incorrect to do so, for the buffalo is an Old World animal. Europe has buffaloes, but not true natives; they are the descendants of stock imported centuries ago from Asia. In many European countries this type of buffalo is everything to the people, as the ox once was to us. It plows, harrows, draws loads, carries burdens on its back, affords milk, butter, cheese, meat and leather, all in turn.

For all its long ages of civilization the buffalo of Europe, like its cousins in the East, remembers by instinct its wild ways. It loves a mud-bath and the lush vegetation of marsh land. It has never been entirely tamed. Sometimes the old fierceness breaks out and the animal is dangerous to all around it.

FIERCE BUFFALOES THAT SEEM TO HAVE CHANGED THEIR HABITS

The Cape buffalo is an untamed member of the tribe, a huge, fierce animal, with enormously thick horns flattened across the brow. One species dwells among high reeds; another is a forest-lover. The courage of these beasts is superb, and one fine bull has been seen to do battle with three lions. Experienced hunters declare that the charge of a furious buffalo bull is more to be feared than that of a lion.

Generally they feed by night and rest by day; but it is asserted that in places much haunted by night-roaming lions buffaloes have changed their habits and feed by day, when lions are not abroad—a very remarkable fact.

Other African buffaloes are clearly offshoots from a common ancestry—the red Congo buffalo, several local races in East Africa, the brown buffalo of the Sudan,

and still more red members in West Africa.

India has buffaloes wild and domesticated. Some of the wild specimens are animals of noble size. The tame buffalo is, however, one of the commonest of domestic animals in India, Burma and the Malay region.

Just as we have distinct breeds of cattle, so India has distinct breeds of tame buffaloes. The resemblance of all to the wild type is obvious, but characteristics have been fixed by a long history of life under man's protection. Now there are Deccan, Gujerat, Gir, Delhi and other distinct varieties.

THE SHY DWARF BUFFALOES THAT DO NOT WORK FOR MEN

They all have their little peculiarities, and they are as likely as the wilder kinds to stampede in moments of panic. But what a force of labor and power they have represented to India! If they did nothing but cultivate the rice-fields they would deserve well of men, for rice is India's staple food.

The tamaraos of the Philippines and the anoa of Celebes are two dwarf types of buffalo—shy, retiring beasts, strangers to the ways of men. They do not toil for us; but the rest of the group atone for all the omissions of the wild tribes.

Their substance and their strength have been a fund of living force upon which man has increasingly drawn, and so has grown mighty.

All human history pivoted upon the first conquest by men of the animals which march upon hoofs. We cannot think of civilization without cattle; until that great age of taming, man was cattleless, an animal without settled abode.

Can you not see now, after reading this story, how great a difference in human history the taming of hoofed animals has made? The question of food was no longer so difficult, and the greater use of leather helped man's progress in many ways. When he found it possible to use the strength in the muscles of cattle, man could accomplish many things.

To-day we use many parts of the animal which were once thrown away. In the great packing-houses not a thing is wasted. Meat, blood, bones, horns, skins, hair, hoofs, intestines, all have their uses. All are turned into things which help to support life or else make it easier.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 1369.

THE CATTLE OF A THOUSAND HILLS



THE AMERICAN BISON, OR BUFFALO, A NATIVE OF THE OPEN PLAINS OF NORTH AMERICA



THE EUROPEAN BISON, STILL FOUND IN THE FORESTS OF THE CAUCASUS

The photographs on these pages are by the Canadian Pacific Railway, Messrs. Gambier Bolton, W. P. Dando, and others.



THE GAYAL AT HOME IN THE HILLS OF INDIA



THE WILD ENGLISH BULL



THE GAUR OF SOUTHEASTERN ASIA



THE YAK AT HOME IN THE MOUNTAINS OF TIBET



THE BANTIN, OR JAVAN OX



A ZEBU FROM INDIA



HIGHLAND



DEVON



LONGHORN



BROWN SWISS



DAIRY SHORTHORN



GALLOWAY



KERRY



FRENCH CANADIAN

EIGHT WELL-KNOWN BREEDS OF CATTLE



THE POETRY OF COMMON THINGS

THERE is hardly any end to the subjects with which poetry may be concerned, since poetry is as varied and extensive in its range as life itself. It is life in song. We have not, therefore, attempted to go further in these little lessons than to mention the chief departments of poetry, and we have already covered most of the field. References to the work of different poets will be found in the Book of Literature, where we deal with the writers of the great poems; while all the poets who are not important enough to come under that description, but have written verses worthy of being included in the Book of Poetry, are noticed there.

What remains for us to remark is the fact that great events are not always needed to furnish the poet with a theme for his muse. The term "poet's muse" is an expression derived from ancient times, when spirits or goddesses were supposed to watch over and inspire writers. These goddesses were called "the muses," and the ancient poets always began their poems by calling upon the Muse of Poetry to inspire them. Homer begins the *Iliad*:
Achilles' wrath, to Greece the direful spring
Of woes unnumbered, heavenly goddess, sing!

Assuredly the poet's muse does not depend upon the stirring times of war for inspiration, and that for the reason so well expressed by Milton in the famous lines:



CONTINUED FROM 1148

Peace hath her victories
No less renowned
than war.

The pages of the Book of Poetry abound in beautiful poems that derive their interest entirely from daily life and the common things around us. There is poetry in everything, if we have only the soul to search it out. There is poetry in the common horse, working out its laborious life in the city streets, as well as in the Arab's steed in splendid flight across the plain. There is poetry in the meadow, with its buttercups, its lambs, its gentle streams. There is poetry in the old armchair, the grandfather's clock, the kindly blue smoke arising from the hearth of the old village home. All common things are beautiful in the eye of the poet who loves his fellow-men and the quiet ways of life; and all these things are celebrated in English poetry, which is remarkably rich in praise of the human affections.

After all, these are the enduring memories—the house we played in as little children, the friendly cat and dog, the fire in the old grate where we used to see such wonders in the coals, the old chair, the flowers at the window.

When we have concluded these little studies of poetry, the Book of Poetry itself will be continued, as the young reader will have received sufficient assistance to enable him or her to take a serious interest in and understand the poems which are reprinted in it. 1269

COME INTO THE GARDEN, MAUD

This beautiful song is from the long poem of Maud by Tennyson. A family quarrel has divided childhood friends, but when Maud comes back from abroad she and her old playmate fall deeply in love. He is now waiting in her garden to see her in the splendor of raiment that she has worn to entertain her brother's guests. There is no hint here of the tragedy lurking near by.

COME into the garden, Maud,

For the black bat, night, has flown,

Come into the garden, Maud,

I am here at the gate alone;

And the woodbine spices are wafted abroad,

And the musk of the rose is blown.

All night have the roses heard

The flute, violin, bassoon;

All night has the casement jessamine stirred

To the dancers dancing in tune;

Till a silence fell with the waking bird,

And a hush with the setting moon.

I said to the lily, "There is but one

With whom she has heart to be gay,

When will the dancers leave her alone?

She is weary of dance and play."

Now half to the setting moon are gone,

And half to the rising day;

Low on the sand and loud on the stone

The last wheel echoes away.

I said to the rose, "The brief night goes

In babble and revel and wine.

O young lord-lover, what sighs are those,

For one that will never be thine?

But mine, but mine," so I sware to the rose,

"For ever and ever, mine."

And the soul of the rose went into my blood,

As the music clashed in the hall:

And long by the garden lake I stood,

For I heard your rivulet fall

From the lake to the meadow and on to the wood,

Our wood, that is dearer than all;

From the meadow your walks have left so sweet

That whenever a March-wind sighs

He sets the jewel-print of your feet

In violets blue as your eyes,

To the woody hollows in which we meet

And the valleys of Paradise.

Queen rose of the rosebud garden of girls,

Come hither, the dances are done,

In gloss of satin and glimmer of pearls,

Queen lily and rose in one;

Shine out, little head, sunning over with curls,

To the flowers, and be their sun.

There has fallen a splendid tear

From the passion-flower at the gate.

She is coming, my dove, my dear;

She is coming, my life, my fate;

The red rose cries, "She is near, she is near";

And the white rose weeps, "She is late";

The larkspur listens, "I hear, I hear";

And the lily whispers, "I wait."

She is coming, my own, my sweet;

Were it ever so airy a tread,

My heart would hear her and beat,

Were it earth in an earthy bed;

My dust would hear her and beat,

Had I lain for a century dead;

Would start and tremble under her feet,

And blossom in purple and red.

A SONG FOR ST. CECILIA'S DAY

This Song for St. Cecilia's Day was written by John Dryden. We may read about him in the Book of Literature.

FROM harmony, from heavenly harmony,

This universal frame began:

When nature underneath a heap

Of jarring atoms lay,

And could not heave her head,

The tuneful voice was heard from high,

"Arise, ye more than dead!"

Then cold, and hot, and moist, and dry,

In order to their stations leap,

And Music's power obey.

From harmony, from heavenly harmony,

This universal frame began:

From harmony to harmony

Through all the compass of the notes it ran,

The diapason closing full in Man.

What passion cannot Music raise and quell?

When Jubal struck the chordèd shell,

His listening brethren stood around,

And, wondering, on their faces fell

To worship that celestial sound:

Less than a God they thought there could
not dwell

Within the hollow of that shell

That spoke so sweetly and so well.

What passion cannot Music raise and quell?

The trumpet's loud clangor

Excites us to arms,

With shrill notes of anger,

And mortal alarms.

The double double double beat

Of the thundering drum

Cries Hark! the foes come;

Charge, charge, 'tis too late to retreat!

The soft complaining flute,

In dying notes, discovers

The woes of hopeless lovers,

Whose dirge is whispered by the warbling
lute.

Sharp violins proclaim

Their jealous pangs and desperation,

Fury, frantic indignation,

Depths of pain, and height of passion,

For the fair, disdainful dame.

But O, what art can teach,

What human voice can reach,

The sacred organ's praise?

Notes inspiring holy love,

Notes that wing their heavenly ways

To mend the choirs above.

Orpheus could lead the savage race;

And trees uprooted left their place,

Sequacious of the lyre;

But bright Cecilia raised the wonder higher:

When to her organ vocal breath was given,

An angel heard, and straight appeared

Mistaking Earth for Heaven.

Grand Chorus

As from the power of sacred laws

The spheres began to move,

And sung the great Creator's praise

To all the Blest above;

So when the last and dreadful hour

This crumbling pageant shall devour,

The trumpet shall be heard on high,

The dead shall live, the living die,

And Music shall untune the sky!

THE CULPRIT FAY

Joseph Rodman Drake tells us here the story of a little fay who has sinned against elfin law by falling in love with a mortal maiden. The scene is laid in a woodland glade at midnight. All the elves are assembled before the throne of their king, who has summoned the culprit to hear sentence passed upon his wrongdoing. No sound is heard on the mountainside where the fairy court is held, and only the moon and stars look down upon it. The winds and even the night birds are hushed and still.

THE throne was reared upon the grass,
Of spice-wood and of sassafras;
On pillars of mottled tortoise-shell
Hung the burnished canopy—
And over it gorgeous curtains fell
Of the tulip's crimson drapery.
The monarch sat on his judgment-seat,
On his brow the crown imperial shone.
The prisoner Fay was at his feet,
And his peers were ranged around the throne.
He waved his sceptre in the air,
He looked around and calmly spoke;
His brow was grave and his eye severe,
But his voice in a softened accent broke:
"Fairy! fairy list and mark:
Thou hast broke thine elfin chain;
Thy flame-wood lamp is quenched and dark,
And thy wings are dyed with a deadly
stain—
Thou hast sullied thine elfin purity
In the glance of a mortal maiden's eye.
Thou hast scorned our dread decree,
And thou shouldst pay the forfeit high.
But well I know her sinless mind
Is pure as the angel forms above,
Gentle and meek, and chaste and kind,
Such as a spirit well might love;
Fairy! had she spot or taint,
Bitter had been thy punishment.
Tied to hornet's shardy wings;
Tossed on the pricks of nettle's stings;
Or seven long ages doomed to dwell
With the lazy worm in the walnut-shell;
Or every night to writhe and bleed
Beneath the tread of the centipede;
Or bound in a cobweb dungeon dim,
Your jailer a spider huge and grim,
Amid the carrion bodies to lie,
Of the worm, and the bug, and the murdered
fly:
These it had been your lot to bear,
Had a stain been found on the earthly fair.
Now list, and mark our mild decree—
Fairy, this your doom must be:
"Thou shalt seek the beach of sand
Where the water bounds the elfin land;
Thou shalt watch the oozy brine
Till the sturgeon leaps in the bright moon-
shine.
Then dart the glistening arch below,
And catch a drop from his silver bow.
The water-sprites will wield their arms
And dash around, and roar and rave,
And vain are the woodland spirits' charms,
They are the imps that rule the wave.
Yet trust thee in thy single might:
If thy heart be pure and thy spirit right,
Thou shalt win the warlock fight.
"If the spray-bead gem be won,
The stain of thy wing is washed away:
But another errand must be done
Ere thy crime be lost for aye;

Thy flame-wood lamp is quenched and dark,
Thou must re-illumine its spark.
Mount thy steed and spur him high
To the heaven's blue canopy;
And when thou seest a shooting-star,
Follow it fast, and follow it far—
The last faint spark of its burning train
Shall light the elfin lamp again.
Thou hast heard our sentence, Fay;
Hence! to the water-side, away!"

The goblin marked his monarch well;
He spake not, but he bowed him low,
Then plucked a crimson colen-bell,
And turned him round in act to go.
The way is long, he cannot fly,
His soiled wing has lost its power,
And he winds adown the mountain high,
For many a sore and weary hour.
Through dreary beds of tangled fern,
Through groves of night-shade dark and dern,
Over the grass and through the brake,
Where toils the ant and sleeps the snake;
Now over the violet's azure flush
He skips along in lightsome mood;
And now he thrids the bramble-bush,
Till its points are dyed in fairy blood.
He has leaped the bog, he has pierced the
brier,
He has swum the brook, and waded the mire,
Till his spirits sank, and his limbs grew weak,
And the red waxed fainter in his cheek.
He had fallen to the ground outright,
For rugged and dim was his onward track,
But there came a spotted toad in sight,
And he laughed as he jumped upon her
back:
He bridled her mouth with a silkweed twist,
He lashed her sides with an osier thong;
And now, through evening's dewy mist,
With leap and spring they bound along,
Till the mountain's magic verge is past,
And the beach of sand is reached at last.

Soft and pale is the moony beam,
Moveless still the glassy stream;
The wave is clear, the beach is bright
With snowy shells and sparkling stones;
The shore-surge comes in ripples light,
In murmurings faint and distant moans;
And ever afar in the silence deep
Is heard the splash of the sturgeon's leap,
And the bend of his graceful bow is seen—
A glittering arch of silver sheen,
Spanning the wave of burnished blue,
And dripping with gems of the river dew.

The elfin cast a glance around,
As he lighted down from his courser toad,
Then round his breast his wings he wound,
And close to the river's brink he strode;
He sprang on a rock, he breathed a prayer,
Above his head his arms he threw,
Then tossed a tiny curve in air,
And headlong plunged in the waters blue.

Up sprung the spirits of the waves,
From the sea-silk beds in their coral caves,
With snail-plate armor snatched in haste,
They speed their way through the liquid waste;
Some are rapidly borne along
On the mailed shrimp or the prickly prong,
Some on the blood-red leeches glide,
Some on the stony starfish ride,

Some on the back of the lancing squab,
 Some on the sideling soldier crab;
 And some on the jellied quarl, that flings
 At once a thousand streamy stings;
 They cut the wave with the living oar,
 And hurry on to the moonlight shore,
 To guard their realms and chase away
 The footsteps of the invading Fay.

Fearlessly he skims along,
 His hope is high, and his limbs are strong:
 He spreads his arms like the swallow's wing,
 And throws his feet with a frog-like fling;
 His locks of gold on the waters shine,
 At his breast the tiny foam-beads rise,
 His back gleams bright above the brine,
 And his wake-line foam behind him lies.
 But the water-sprites are gathering near
 To check his course along the tide;
 Their warriors come in swift career
 And hem him round on every side;

He howls with rage, and he shrieks with pain,
 He strikes around, but his blows are vain;
 Hopeless is the unequal fight,
 Fairy! naught is left but flight.

He turned him round, and fled amain
 With hurry and dash to the beach again,

Oh! but a weary wight was he
 When he reached the foot of the dog-wood tree.
 —Gashed and wounded, and stiff and sore,
 He laid him down on the sandy shore;

Soon he gathered the balsam dew
 From the sorrel-leaf and the henbane bud;
 Over each wound the balm he drew,
 And with cobweb lint he stanch'd the blood.
 The mild west wind was soft and low,
 It cooled the heat of his burning brow,
 And he felt new life in his sinews shoot,
 As he drank the juice of the calamus root;
 And now he treads the fatal shore,
 As fresh and vigorous as before.

He cast a saddened look around,
 But he felt new joy his bosom swell,
 When, glittering on the shadowed ground,
 He saw a purple mussel-shell;
 Thither he ran, and he bent him low,
 He heaved at the stern and he heaved at the bow,

And he pushed her over the yielding sand,
 Till he came to the verge of the haunted land.
 She was as lovely a pleasure-boat

As ever fairy had paddled in,
 For she glowed with purple paint without,
 And shone with silvery pearl within;
 A sculler's notch in the stern he made,
 An oar he shaped of the bootle-blade;
 Then sprung to his seat with a lightsome leap,
 And launched afar on the calm, blue deep.

The imps of the river yell and rave;
 They had no power above the wave,
 But they heaved the billow before the prow,
 And they dashed the surge against her side,
 And they struck her keel with jerk and blow,
 Till the gunwale bent to the rocking tide.

Onward still he held his way,
 Till he came where the column of moonshine lay,

And saw beneath the surface dim
 The brown-backed sturgeon slowly swim;
 Around him were the goblin train—
 But he sculled with all his might and main,
 And followed wherever the sturgeon led,
 Till he saw him upward point his head;
 Then he dropped his paddle-blade,
 And held his colen goblet up

To catch the drop in its crimson cup.
 With sweeping tail and quivering fin,
 Through the wave the sturgeon flew,
 And, like the heaven-shot javelin,
 He sprung above the waters blue.

Instant as the star-fall light
 He plunged him in the deep again,
 But left an arch of silver bright,
 The rainbow of the moony main.

It was a strange and lovely sight
 To see the puny goblin there:
 He seemed an angel form of light,
 With azure wing and sunny hair,
 Throned on a cloud of purple fair,
 Circled with blue and edged with white,
 And sitting at the fall of even
 Beneath the bow of summer heaven.

A moment, and its lustre fell;
 But ere it met the billow blue,
 He caught within his crimson bell

A droplet of its sparkling dew—
 Joy to thee, Fay! thy task is done,
 Thy wings are pure, for the gem is won—
 Cheerly ply thy dripping oar,
 And haste away to the elfin shore.

A moment stayed the fairy there;
 He kissed the beach and breathed a prayer;
 Then spread his wings of gilded blue,
 And on to the elfin court he flew;

Up, Fairy! quit thy chickweed bower,
 The cricket has called the second hour,
 Twice again, and the lark will rise
 To kiss the streaking of the skies—
 Up! thy charmed armor don,
 Thou'lt need it ere the night be gone.
 He put his acorn helmet on;
 It was plumed of the silk of the thistle-down;
 The corslet plate that guarded his breast
 Was once the wild bee's golden vest;
 His cloak, of a thousand mingled dyes,
 Was formed of the wings of butterflies;
 His shield was the shell of a lady-bug queen,
 Studs of gold on a ground of green;
 And the quivering lance which he brandished
 bright,

Was the sting of a wasp he had slain in fight.
 Swift he bestrode his fire-fly steed;
 He bared his blade of the bent-grass blue;
 He drove his spurs of the cockle-seed,
 And away like a glance of thought he flew,
 To skim the heavens and follow far
 The fiery trail of the rocket-star.

Up to the vaulted firmament
 His path the fire-fly courser bent,
 And at every gallop on the wind,
 He flung a glittering spark behind;

He flies like a feather in the blast
Till the first light cloud in heaven is past.
But the shapes of air have begun their work,
And a drizzly mist is round him cast,
He cannot see through the mantle murk,
He shivers with cold but he urges fast;
Through storm and darkness, sleet and shade,
He lashes his steed and spurs amain,
For shadowy hands have twitched the rein,
And flame-shot tongues around him played,
And near him many a fiendish eye
Glared with a fell malignity,
And yells of rage, and shrieks of fear,
Came screaming on his startled ear.

His wings are wet around his breast,
The plume hangs dripping from his crest,
His eyes are blurred with the lightning's glare,
And his ears are stunned with the thunder's
blare,
But he gave a shout, and his blade he drew,
He thrust before and he struck behind,
Till he pierced their cloudy bodies through,
And gashed their shadowy limbs of wind;
Howling the misty spectres flew,
They rend the air with frightful cries,
For he has gained the welkin blue,
And the land of clouds beneath him lies.

But the elfin made no stop or stay
Till he came to the bank of the milky way,
Then he checked his courser's foot,
And watched for the glimpse of the planet-
shoot.

Sudden along the snowy tide
That swelled to meet their footsteps' fall,
The sylphs of heaven were seen to glide,
Attired in sunset's crimson pall;
Around the Fay they weave the dance,
They skip before him on the plain,
And one has taken his wasp-sting lance,
And one upholds his bridle-rein;
With warblings wild they lead him on
To where, through clouds of amber seen,
Studded with stars, resplendent shone
The palace of the sylphid queen.
Its spiral columns, gleaming bright,
Were streamers of the northern light;
Its curtain's light and lovely flush
Was of the morning's rosy blush;
And the ceiling fair that rose aboon,
The white and feathery fleece of noon.

But, Oh! how fair the shape that lay
Beneath a rainbow bending bright;
She seemed to the entranced Fay
The loveliest of the forms of light;
Her mantle was the purple rolled
At twilight in the west afar;
'Twas tied with threads of dawning gold,
And buttoned with a sparkling star.
Her face was like the lily roon
That veils the vestal planet's hue;
Her eyes, two beamlets from the moon,
Set floating in the welkin blue.
Her hair is like the sunny beam,
And the diamond gems which round it gleam
Are the pure drops of dewy even
That ne'er have left their native heaven.

She raised her eyes to the wondering sprite,
And they leaped with smiles, for well I ween

Never before in the bowers of light
Had the form of an earthly Fay been seen.
Long she looked in his tiny face;
Long with his butterfly cloak she played;
She smoothed his wings of azure lace,
And handled the tassel of his blade;
And as he told in accents low
The story of his love and woe,
She felt new pains in her bosom rise;
And the tear-drop started in her eyes.
And "O sweet spirit of earth," she cried,
"Return no more to your woodland height,
But ever here with me abide
In the land of everlasting light!"

"Lady," he cried, "I have sworn to-night,
On the word of a fairy knight,
To do my sentence-task aright;
My honor scarce is free from stain,
I may not soil its snows again;
Betide me weal, betide me woe,
Its mandate must be answered now."
Her bosom heaved with many a sigh,
The tear was in her drooping eye;
But she led him to the palace gate,
And called the sylphs who hovered there,
And bade them fly and bring him straight
Of clouds condensed a sable car.
With charm and spell she bless'd it there,
From all the fiends of upper air;
Then round him cast the shadowy shroud,
And tied his steed behind the cloud;
And pressed his hand as she bade him fly
Far to the verge of the northern sky,
For by its wane and wavering light
There was a star would fall to-night.

Borne afar on the wings of the blast,
Northward away he speeds him fast,
And his courser follows the cloudy wain
Till the hoof-strokes fall like pattering rain.
The clouds roll backward as he flies,
Each flickering star behind him lies,
And he has reached the northern plain,
And backed his fire-fly steed again,
Ready to follow in its flight
The streaming of the rocket-light.

The star is yet in the vault of heaven,
But it rocks in the summer gale;
And now 'tis fitful and uneven,
And now 'tis deadly pale;
And now 'tis wrapped in sulphur smoke,
And quenched is its rayless beam,
And now with a rattling thunder-stroke
It bursts in flash and flame.
As swift as the glance of the arrowy lance
That the storm-spirit flings from high,
The star-shot flew o'er the welkin blue.
As it fell from the sheeted sky.
As swift as the wind in its trail behind
The elfin gallops along,
The fiends of the clouds are bellowing loud,
But the sylphid charm is strong;
He gallops unhurt in the shower of fire,
While the cloud-fiends fly from the blaze,
He watches each flake till its sparks expire,
And rides in the light of its rays.
But he drove his steed to the lightning's speed,
And caught a glimmering spark;
Then wheeled around to the fairy ground,
And sped through the midnight dark.

LITTLE VERSES FOR VERY LITTLE PEOPLE

I LOVE sixpence, pretty little sixpence,
 I love sixpence better than my life;
 I spent a penny of it, I gave a penny
 of it,
 And I took fourpence home to my
 wife.

Oh! my little fourpence, pretty little
 fourpence.
 I love fourpence better than my life;
 I spent a penny of it, I gave a penny
 of it,
 And I took twopence home to my
 wife.

Oh! my little twopence, pretty little
 twopence,
 I love twopence better than my life;
 I spent a penny of it, I gave a penny
 of it,
 And I took nothing home to my
 wife.

Oh! my little nothing, pretty little
 nothing.
 What will nothing buy for my wife?
 I have nothing, I spend nothing,
 I love nothing better than my wife.

PEASE-PUDDING hot,
 Pease-pudding cold,
 Pease-pudding in the pot,
 Nine days old.
 Some like it hot,
 Some like it cold,
 Some like it in the pot,
 Nine days old.

THE fair maid, who, the First of May,
 Goes to the fields at break of day,
 And washes in dew from the hawthorn
 tree,
 Will ever after handsome be.

PRETTY maid,
 Pretty maid,
 Where have you been?
 Gathering a posie
 To give to the queen.

Pretty maid,
 Pretty maid,
 What gave she you?
 She gave me a diamond
 As big as my shoe.

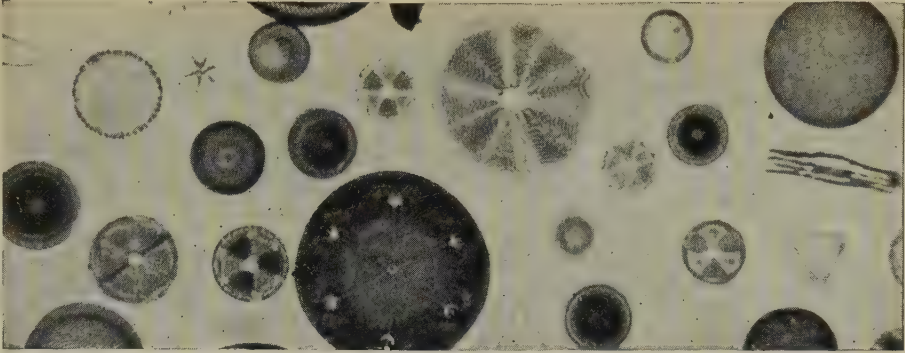
LITTLE Miss Muffet,
 She sat on a tuffet,
 Eating of curds and whey;
 There came a big spider
 And sat down beside her,
 And frightened Miss Muffet away.



HIGGLEPY, Piggieby,
 My black hen,
 She lays eggs
 For gentlemen;
 Sometimes nine,
 And sometimes ten,
 Higglepy, Piggieby,
 My black hen.

FIDDLE-DE-DEE, fiddle-de-dee, the fly has married the humble-bee;
 They went to church, and married was she; the fly has married the
 humble-bee.





A highly magnified group of the flinty coverings of diatoms, tiny one-celled plants.

PLANTS IN THEIR HOMES

PLANTS have such great powers of spreading over land and sea that we cannot wonder that there is no vacant corner anywhere.

Many of the scattered seeds come to nothing, for some fall on stony ground, others are choked, and others are devoured; but the plant makes up for these risks by producing countless seeds that are not needed. As Tennyson wrote of nature, "of fifty seeds she often brings but one to bear"; and he afterward thought he should have written "myriad" instead of "fifty."

Linnaeus, whom we call the "father of modern botany," calculated that if an annual plant—dying within the year—produced only two seeds, and if the seedlings next year grew up into plants, producing two seeds each, and so on, there would be in twenty years a million plants. But this calculation started from a very slow rate of multiplication—only two seeds at a time; whereas in a single season the number of seeds produced, say, by an average radish, is 10,000; by a shepherd's purse, 64,000; by a tobacco plant, 360,000; by a false flax plant, 730,000.

The flower of a grass has only one seed, but a single flower of one of the orchids may have 1,756,440 seeds in its seed-box. Another of the orchids is said to produce 74,000,000 seeds



from the plant considered as a whole.

Thus, we see that the plant can often

afford to lose many of its seeds. Or, to put it in another way, those plants have succeeded well which have a safe margin

of seeds in proportion to their chances of failure. A false flax plant with about three-quarters of a million seeds in a year, would cover the whole land surface of the earth in three years. This does not happen, because the chances of death are so great and because many localities are quite impossible for this kind of plant.

In connection with the power of spreading that many plants have, a practical point of great importance is the invasion of a country by weeds.

What usually happens is that man introduces a strange plant into a new country, where it runs riot. It may find many empty niches to fill, and it may be free from the competition that kept it within bounds at home. Thus, the nettle, the shepherd's purse and the greater plantain have followed man wherever he has gone—like rats! An English botanist tells us that one of three British nettles is reported to have been brought to Britain by the Romans, but it still grows only near some of the villages of the south coast of England. Parkinson, the author of one of the great herbals, tells us that Roman soldiers brought the seed with

them and sowed it at Romney for their own use—to rub and chafe their limbs when, through extreme cold, they were stiff and benumbed. A North American kind of feverfew has, in recent times, established itself around many east-coast fishing villages in Britain, and has become, in some places, more abundant than the native species.

HOW THE PLANTS GO OUT INTO THE WORLD AND SEEK NEW KINGDOMS

This sort of thing is continually happening. Sometimes, as with the prickly-pear in Australia, the invasion is a calamity. It is very striking to read that 550 kinds of plants have been introduced into New Zealand, which has a native flora of 750 species; and the new-comers often tend to oust the natives on grazed, cultivated and cleared ground. The same thing is true when new animals are introduced.

Darwin called attention to the case of the cardoon thistle, which was introduced from Spain to La Plata, where it soon spread over enormous tracts of country, ousting other plants. Professor Bower gives an example of a native plant of Mexico which was introduced into Ceylon as a garden plant in 1828 and has spread all over the island, taking up waste land to the exclusion of other plants. The cardoon thistle is spread by the wind which wafts the down everywhere, but the Mexican plant is spread by birds.

While plants have this great power of spreading, and are always, so to speak, looking out for new kingdoms to conquer, the other great fact is that certain kinds of plants are found living together in certain localities. The conditions of life are very different in different places, and each locality has its own type of plant life or vegetation. Many kinds of plants are so well suited for particular surroundings that if the seeds are sown somewhere else, they do not sprout, or if they sprout, the seedlings do not flourish. Many run riot for a year and then vanish.

THE RICH AND BEAUTIFUL SEAWEED AND ITS GRACEFUL FORMS

If we ask what are the great haunts of life for animals, the answer must be: the shore of the sea, the open sea, the deep sea, the fresh waters, the dry land and the air. Let us first inquire how this general grouping applies to plants; and then we can pass to the different kinds of plant associations found on dry land.

There is a rich and beautiful vegetation of seaweed in the shallow waters near the shore, extending up to the space between the tide-marks. Fastened to rocks and stones and big shells, and also to other seaweeds, there are hundreds of different kinds of graceful forms, from minute growths to great pennons many yards long. If there is a sloping shore the seaweeds extend down and down till there is not enough light to allow them to flourish. All of them have the green pigment called chlorophyl, which enables them to utilize the sunlight as a source of power; but in the brown and red seaweeds the green is veiled by other colors. It is believed by some botanists that the brown seaweeds can make more use of the light than the green ones can, and that the red ones can get along with scantier light than the brown ones. In any case, the green ones are usually highest up, and the red ones lowest down in the water.

Seaweeds absorb air, water and salts by the general surface of their fronds; they have no roots in the true sense, only holdfasts or anchors; they are very tough and very pliable, so that they are not readily broken by the waves, and they often have gas-reservoirs, as we see in the common bladder-wrack, which buoy them up.

PLANTS OF THE SEA AS COUNTLESS AS THE STARS IN THE SKY

Often among the seaweeds grows the sea-grass, which is a true flowering plant. Its dry leaves are familiar to us in the cases sometimes woven round bottles of olive oil. In localities where it flourishes its fragments form an important part of the vegetable sea-dust that is wafted down the slope and is the chief food of many of the animals living on the shore area.

The plants of the open sea, away from the shore, are generally very minute, but they are countless. There may be more of them in a bucket of water than we can see of stars on a clear night. They are sometimes so multitudinous that the water has a distinct plant-smell. Most of them are microscopic seaweeds, such as diatoms, but they form what Sir John Murray called the floating sea-meadows. They sometimes make the surface waters like a vegetable soup, so numerous are they; and they form the main food supply of those open-sea animals that are vegetarians. The great drifting beds of sar-

HOW A PLANT RISES IN THE WORLD



The European frogbit, with two winter buds lying at the bottom of a pond.



THE BUD OF A WATER FROGBIT IN SUCCESSIVE STAGES OF DEVELOPMENT

The aquatic frogbit, which spreads along the surface of ponds, has no seeds, and multiplies by buds which drop to the bottom and lie there all winter. In spring the buds rise to the surface and quickly develop.

gasso weed in the Atlantic Ocean are impressive, and have an animal population of their own; but the seaweeds composing them have generally been torn by storms and currents from distant shores. As is so often the case, the more prominent things like the sargasso banks are not nearly so important as the small things. Especially we must remember the invisible bacteria of the Open Sea, which play a great part in the constant circulation of matter.

As for the Deep Sea, there are no plants which live there, for, apart from luminescent animals, it is a world of darkness. There do not even seem to be bacteria in the great abysses, so that there can be no rotting. Of course there are the remains of surface plants, like diatoms, which have died or have been killed in the Open Sea and have sunk slowly down to the great depths—a contribution to the scanty rations there.

THE FLOATING MEADOWS ON THE WATER OF A LAKE

In the open waters of a lake there are often "floating meadows" of very tiny plants, such as diatoms, desmids and blue-green algæ. These are devoured by small crustaceans, and these, again, by fresh-water fishes, often with several transformations between. It is in this way that the world is kept going. At certain times, especially in spring, the multiplication of tiny water-plants may be so prolific that the water of the pond comes to look like living soup.

But there are plants of higher degree which also float quite freely. Thus, near the shore in sheltered nooks the surface of the water is often covered with the familiar duckweed. What look like leaves are flattened shoots, very buoyant and difficult to wet. On the under-side are delicate white roots, used in absorbing water, and on the edge of some of the disks there are very small flowers. There is another kind of duckweed (*Wolffia arrhiza*) which has still smaller flowers and no roots. This is probably the smallest flowering plant to be found in nature.

Another unattached plant, widely distributed in ponds and lakes, is the bladderwort, with beautiful golden flowers that are lifted out of the water on rather long stalks about midsummer. It has no roots, and the long floating stems are beset with small traps—apparently trans-

formed leaves which catch many tiny water-animals. Duckweed, bladderwort and frogbit form store-buds in late summer, which sink to the bottom, remain as if asleep through the winter, and float up again in spring to the surface, where they start new plants. This is their way of multiplying—by detaching buds; but both these plants are also able to multiply by seeds.

THE FLOWERING PLANTS OF THE LAKE AND HOW THEY GROW

But only a very few of the flowering plants of a lake are unattached. The great majority are rooted on the floor and have their leaves on or near the surface. The water-lily is a good example. It is a perennial, rooted in the mud, with a long buoyant shoot, and with broad leaves floating on the surface, as is also true, in some species, of the beautiful flowers. The little openings—stomata—which allow of exchange of gases with the atmosphere, and also regulate the giving-off of water-vapor from the plant, are in ordinary leaves chiefly or entirely on the under-surface; but in the water-lily they are all on the upper surface. This is a kind of special fitness that explains itself, for little openings would not be of any use on a surface which is continually washed with water.

The pondweeds, with their glossy leaves, are very common fresh-water plants, and it is interesting to find that, while some kinds have leaves that float and leaves that live below the water, there are others whose leaves are all submerged, only the flowers coming to the top. There are other submerged fresh-water plants, such as the gritty stoneworts and water-nymph, found in lakes with much lime in the water, which may cover the floor for large areas and extend downward to a depth of about a hundred feet. The stoneworts are a kind of algæ.

THE HOMES OF THE LAND-PLANTS AND THEIR TENANTS

In similar fresh-water basins we find similar plants, and they have certain characters in common. The flowering plants (not the algæ) have evidently taken to the water from the land, and many of them have lost some things they once had. Their roots are often less important than those of land-plants, and they may be absent altogether; they are thin-skinned, for they often absorb by their whole surface; they are lightly built, for they are

THE LIFE-STORY OF A FAMILIAR MOSS



1. These pictures show the life-story of hair-cap moss, which has its male and female parts on separate plants.

2. Here we see the sperm-bearing organs highly magnified. These break and release small sperms which are curved.

3. The sperm enters the flask-shaped receptacle, here shown highly magnified, and works its way down the neck to the egg-cell.



4. The union of the sperm and egg results in the formation of a long-stalked capsule, shown here greatly enlarged.

5. When not yet ripe the capsule is green and is covered by a brown, hairy cover, which later becomes detached.

6. When the capsule ripens, the lid is cast off and teeth are seen, closing up tiny openings; but in dry weather these shrivel.

7. The spores germinate and produce thread-like growths, here seen at successive stages.

Hill
Coles

supported by the water; they often have spaces full of air which make them buoyant. In these and many other ways they are fitted to live in their home.

It may seem absurd to speak of plants in the air, yet we have to remember that there are many perched plants which live off the ground altogether, on the stems and branches of other plants.

Many of the orchids do not touch earth at all, and they must get water from the rain or by condensing the vapor in the moist atmosphere. The pitcher-plants grow in bogs, and capture insects as food.

It must also be noted that many bacteria spend part of their life floating in the air; and perhaps it is not far-fetched to remind ourselves of the air journeys of spores and pollen-grains and wind-sweep seeds.

The homes of the land-plants are very varied, and each has tenants in some measure suited to the particular conditions.

Communities whose members have a good deal in common are called plant associations.

Thus there are associations suited for the bog, the marsh, the moor, the high mountains, the desert, the forest country, the seashore, the barren grounds, or tundras, of the Far North, the sand-dunes, and so on. This does not mean that the desert plants of one dry and parched land need be exactly the same as those in another similar region two thousand miles away; what is meant is that the vegetation in the two arid regions will show similar fitnesses, or adaptations, to the peculiar conditions of life. The Alpine plants of Mont Blanc may be very different from those of Mount Everest, but they are sure to show some similarities

of appearance. And, of course, there are many instances of closely related plants, such as the groundsels, occurring in similar places far apart.

Let us take some examples of different vegetations. One of the poorest is that of the tundra, as the barren grounds to the north of Europe and Asia are generally called.

The deeper parts of the soil there remain permanently frozen, and it is hard for any plant to make a living, so that there is in the worst places little beyond mosses and lichens. It is the same sort of scanty vegetation that we see growing on the tops of the mountains that are not snow-covered.

On more favorable ground in the Far North there may be dwarf willows and hardy grasses, and sometimes there are bulbous plants like tulips which make the desert blossom like the rose in the short period of the springtime.

Gradually the tundra passes into moorland, with grasses and sedges, cranberries and crowberries, willows

and birches. There is probably much heather, which succeeds so well because it has entered into partnership with a fungus. In wet places we may perhaps find great stretches of bog-moss, which, along with other bog-plants, forms peat.

Where the ground is less water-logged, and where the water is less sour than in the peat-bog, there is a wealth of cotton-grass or sedge, with its white flags, the fragrant bog-myrtle, the beautiful Grass of Parnassus, and the delicate bog-pimpernel. Where the earthworms have been able to make more than a little soil, and where there is some drainage, we reach what may be called pasture land.



The beautiful Yucca plant, a native of America, which has been carried to Europe.

On another line is the steppe country, such as we may find in our North American prairies. The prevalent plants are suited to survive a long summer drought, and it is not often that there are trees. Where the soil is better and the dry season less severe and prolonged, the steppe may give place to meadow lands with a rich grassy vegetation. The long parallel leaves of the grass make it possible for the plants to live in dense crowds without hopelessly overshadowing one another.

On another line are the natural forests. These are great societies of trees, and their extension is limited by conditions of temperature. For there cannot be forests where the average temperature in the growing and leafing season of the year falls below 46° Fahrenheit. But the variety of forests is a long story in itself; there are pine forests and tropical forests; there are palm groves and jungles, and many more; and besides the trees there is the ground-vegetation of shade-loving plants.

THE TRANSFORMATION SCENES IN THE LIFE OF PLANTS

We may pass through many different types of vegetation in a day's walk, for we may begin with a sort of desert country on the sand-dunes, and pass into meadow land; we go on to climb the lower slopes of the mountain through the forest zone and then get into upland pasture like steppe land; we skirt the bogs and tramp through the heather-covered moor; we climb to the top and find ourselves in a tundra with nothing but lichens and moss.

It is interesting to discover near at home the miniature kinds of vegetation that in some parts of the world spread over enormous tracts of country. Thus, where the sand has been swept from the shore on to the inland flats, and has smothered many of the plants, we have a hint of the great desert. The rich meadow is a little savanna, and an untended thicket with brambles and honeysuckle is an image of the jungle. Another point is that one vegetation frequently gives place to another, for all things flow. As the tree-stumps often show, the area of the peat-bog may once have been occupied by a forest. The peat-bog itself may become a meadow in the course of time, and the heather-covered moor may come to be covered with grass.

It must be understood that each of the great kinds of vegetations can be divided again into smaller associations. Thus, in an upland moor the botanist would distinguish several zones marked by distinctive plants. There is a bog-moss association, a cotton-grass association, a sedge association, a bilberry association and a heather association. In that order they correspond to a gradually decreasing amount of soil-water.

HOW PLANTS SOLVE THE DROUGHT PROBLEM IN DRY PLACES

The most interesting question in regard to the various haunts and homes of plants is the way the difficulties or peculiarities of the situation in which they live are met and overcome. This is the study of fitness, or adaptation. Let us take as an example those plants that live in very dry places or in places where there is a long dry season. The problem is to make the most of a limited water supply, and there are various solutions. One is to reduce the leaf-area; a cactus, for instance, may do without leaves altogether and form a big globular green stem. Another solution is to have juicy tissues, as in a stonecrop on the wall or an onion in the dry, sandy soil. The juicy interior means a capacity for storing water.

Another way in which plants solve the water problem is to have very deep-growing roots or roots with a very large number of rootlets, for this increases the chances of getting at more of the soil-water. Still another solution is to have a thickened outer skin which will prevent too much evaporation of water, and if this is varnished over with wax, as in some glistening leaves, so much the better. A woolly surface solves the problem in such plants as the mullein.

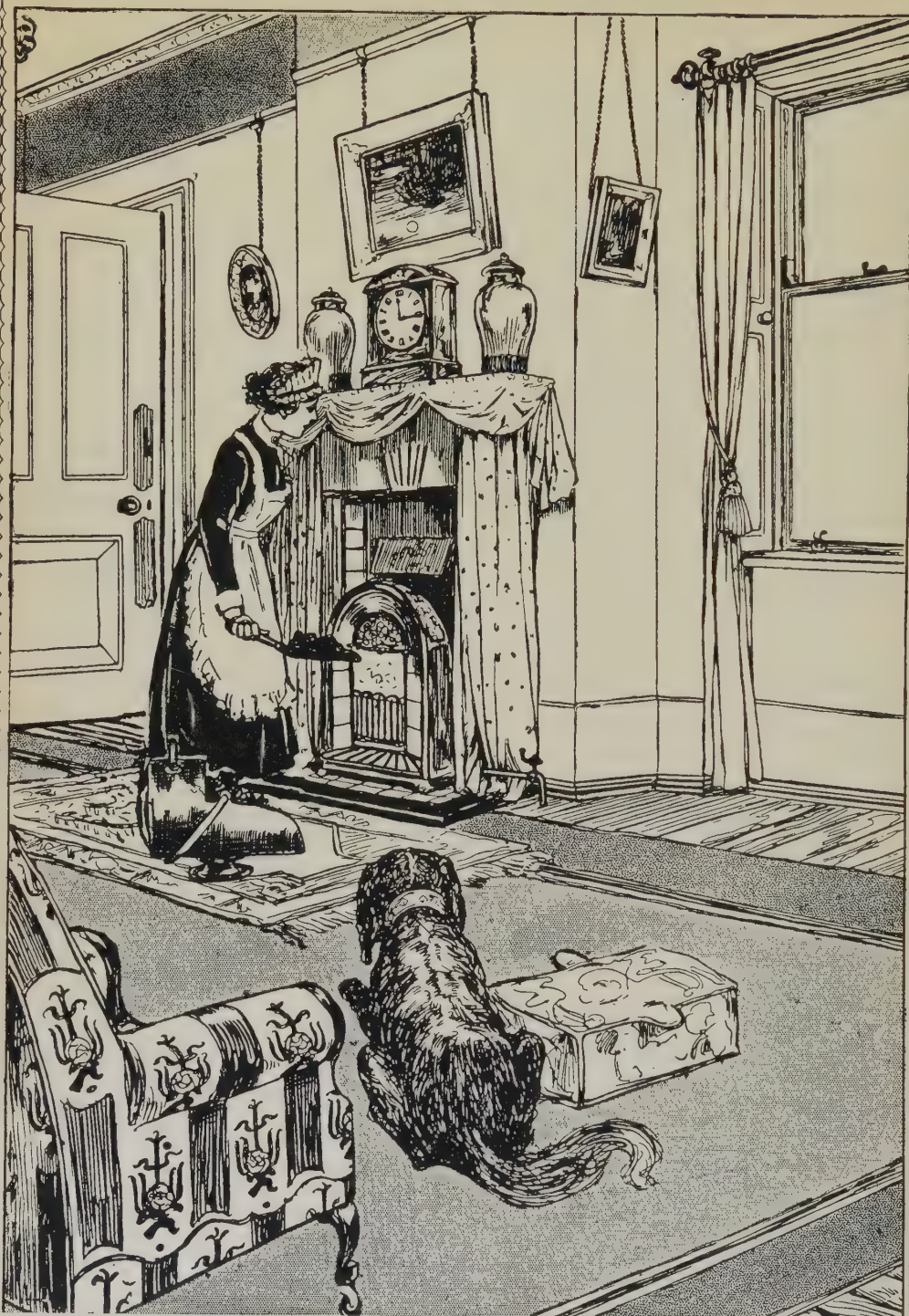
THE REMARKABLE POWER OF THE EUCALYPTUS OF AUSTRALIA

They say that the fragrant oils produced by plants like lavender and rosemary also serve as heat-screens. And how remarkable is the adaptation in the eucalyptus, or blue-gum, tree of Australia. Its leaves do not expose a flat surface to the sky, but hang down with only their edge turned up.

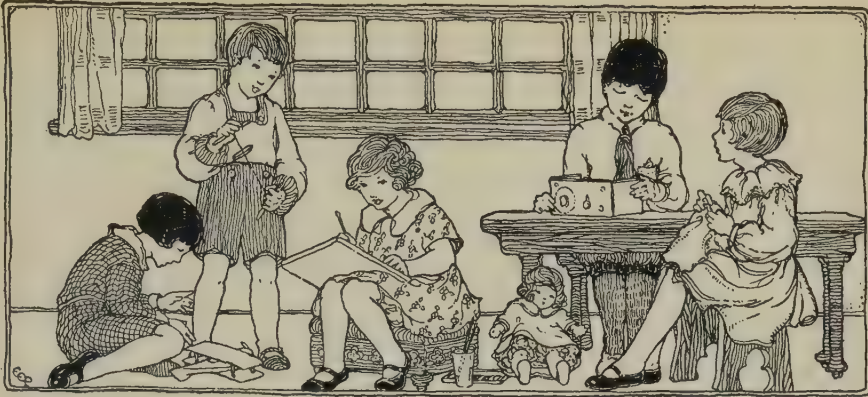
What is true of plants living in dry conditions is true of plants living in wet conditions; they are rich in fitnesses, but these fitnesses are different in each case. How did they become established?

THE NEXT STORY OF PLANT LIFE IS ON PAGE 1387.

WHAT IS WRONG IN THIS ROOM?



This picture has been drawn with seventeen things wrong in it. It will interest you to find out these mistakes and write them down, comparing your list with the correct list which appears on page 1396.



MAKE A USEFUL TRAY OF WOOD OR OF METAL

A SIMPLE tray, suitable for holding either pencils and penholders or pins and the like, is easily made from wood or sheet-metal. If the tray is to be made for your desk or writing table, it should be designed so that it will accommodate the longest pencils and penholders. For this purpose the bottom of the tray should be no less than 9 inches long and about 2 inches wide. On the other hand, if a pin tray is desired, it may be made round, square or any other convenient shape. In either case, the edges and depth should be consistent with the other proportions of the tray.

The accompanying designs show four simple patterns for the desk or pen tray, but the directions may be applied to any other form of tray. After making a full-sized drawing of the desired tray it is next necessary to decide whether it is to be made of wood or of sheet-metal. This may depend upon the materials which you have at hand. In case wood is used, a piece of poplar, gum wood, walnut, mahogany or any other fairly close-grained wood will be satisfactory. A good thickness for wood trays is found to be from $\frac{1}{2}$ to $\frac{3}{8}$ inch for pin trays and from $\frac{3}{4}$ to $\frac{7}{8}$ inch for pen or desk trays. When the design has been transferred to the wood, the tray may be shaped by cutting away or carving out the wood that is not needed, being careful at all times to gouge or chisel with the grain rather than against it. After the tray is properly shaped, it should be finished by using fine or somewhat worn sandpaper. Simple decorations can be cut or inlaid in the wood, or these can be painted a bright color with water colors before the entire tray is rubbed over

CONTINUED FROM 1156

with dark stain and later with wax.

If metal is used, 18- or 20-gauge soft sheet-copper will be found most suitable for this purpose. First, a piece is cut out about half an inch larger than the finished tray is to be. Then on the edge of a piece of wood beat down the depression desired in the tray with a hammer. Cut away the rough edges to the desired outline and lap over or beat back the edges. This consists simply of beating the edges of the tray with a hammer, which causes the metal to become somewhat thicker at the edge, and gives it a more finished appearance.

If the tray is to be a round one similar to those shown in the picture, the method might well be as follows: First cut out of 18- or 20-gauge sheet-copper a circular form about one-fourth inch larger in diameter than the tray is to be. Then lap over or beat back the edge about one-eighth of an inch all around the flat piece of metal. Now beat down the depression in the



Several round metal trays.

tray. To do this you should first draw a line with a pair of compasses where the depression starts; then hold the tray on the end of a block of wood and beat it down over the edge of the block with a hammer along the pencil line. If the plate is to have a deep depression, it will be necessary to soften or *anneal* it, because it becomes hard after it is beaten for a time. This is done by heating it to a red heat in a gas or other flame and then by cooling it in water. This process of cooling copper in water softens it, which is just the opposite from what it does to either steel or iron.

It is possible for older boys and girls to make the edge of the tray with a border design etched

on it. If so, this must be done before the depression is beaten down. The design has to be painted on with asphaltum varnish, which is also used on all parts of the tray that are not to be eaten out or etched by the acid. After this the tray is placed, when dry, in a solution of 1 part nitric acid and 2 parts water, which is poured in a glass dish. The acid will, in a few minutes, begin to eat away the metal that has not been covered. Within from 30 minutes to 3 hours, depending upon the depth desired, it will be etched deep enough for this

purpose. Then take the tray out of the acid and remove the asphaltum varnish by scraping it, or you may soak it for from 20 to 30 minutes in turpentine, gasoline or a solution of lye, and then wipe it off. The copper tray may now be suitably colored and finally finished for use by rubbing oil over its surface with a piece of cloth while it is held several inches above a medium gas or other flame. When the desired color is obtained (care should be taken that the oil does not burn), the tray should be placed where it will cool slowly.

THINGS YOU SHOULD KNOW ABOUT VENEERED AND SOLID FURNITURE

NO doubt you have wondered why so much furniture is known as veneered furniture and why so many persons prefer solid furniture. Although there is a great deal of prejudice against veneered products, a large proportion of all the furniture manufactured has more or less veneered construction in it. The high-grade-finish woods are being used more and more as veneers. Many more table tops, doors, drawer fronts, and side and end panels of all kinds of furniture are built up by gluing three or five layers of wood, than are made of single solid pieces.

The veneer construction has several advantages over solid wood, in addition to permitting the use of cheaper material in the core or on unseen surfaces. These advantages should be borne in mind by the purchaser who thinks that veneering cheapens the product. Alternate plies in practically all built-up panels are laid with their grains running at right angles to each other; that is, in three-ply veneer, the face veneers are glued at right angle to the core, and in five-ply material the face veneers and the core are parallel and the layers between, known as crossbands, are laid at right angles. A panel of this construction has the advantages that it is more nearly of the same

strength in all directions, and that as it absorbs or gives up moisture it shrinks and swells about as much one way as another. Splitting along the grain in one set of plies is made impossible by the cross grain of the alternate plies, and rapid shrinking across the grain in the face veneers is offset by slow shrinkage along the grain in the core.

Veneered panels do not change dimensions as much as solid wood. Warping is largely eliminated in thick panels by plywood construction. More care can be taken in the selection of surface wood in veneered furniture than can be taken in solid furniture. The manufacturer can dry veneer stock very quickly and cheaply, and he can utilize all of his wood to the best advantage.

Veneered furniture, if properly cared for, will last as long as solid furniture. The glued joints when correctly made are as strong as the wood under ordinary service conditions. Long exposure to very damp air or direct contact with water, of course, will decrease the joint strength even when a water-resistant glue is used. But such service conditions would be almost as damaging to solid furniture as to veneered furniture, because even in solid furniture the parts are joined together with glue.

LITTLE PROBLEMS FOR CLEVER PEOPLE

THESE problems are continued from page 1151.

WHAT IS THE QUESTION?

1. "There is one question to which you must always answer 'Yes' if your answer is correct," said Harold.

What is the question?

HOW MANY PASSENGERS?

2. "I will take you for 25 cents each," said the boatman at the ferry. "Will you take two more and make it 20 cents each?" asked a passenger. "Yes," answered the boatman; "I shall make 10 cents more if I do."

How many passengers were taken altogether?

HOW MUCH BAGGAGE ALLOWED?

3. "My excess baggage will cost me \$1.50," said Brown, waiting for the train with his friend Smith. "Let me take some of it for you," said Smith, and he took 120 pounds of it. Smith was charged 20 cents excess, and Brown for his share paid 30 cents excess.

How much baggage was allowed free, and what was the total weight of baggage?

HOW MUCH COAL DID BLACK BUY?

4. Said Black: "By ordering coal direct from the pit, I get 21 cwt. for a ton, and on my last order, when coal was \$6 a ton, I saved \$3.60."

How much coal did he buy?

WHAT DID THE HANDKERCHIEFS COST?

5. A merchant sold handkerchiefs at 9 cents each, or three for 24 cents. One day he saw his assistant sell a lady one handkerchief, and he said, "Why did you not sell the lady three handkerchiefs?" "Because," said the assistant, "you have the same profit on one as you have on three."

What did the handkerchiefs cost the merchant?

WHAT TIME WAS IT?

6. The church-tower clock takes the same time to make three strokes as the town-hall clock takes to make two strokes. "As I came home," said Jones, "they began to strike the hour at the same instant, and the last stroke of the church clock came exactly at the last stroke but two of the town clock."

What time was it?

ANSWERS TO PROBLEMS ARE GIVEN ON PAGE 1398.

HOW TO FIND YOUR WAY IN A FOREST

MOST of us at some time or other during our holiday rambles have been lost in a forest or wood. Perhaps it is raining hard, and we are hurrying for shelter, or we want to catch a train, and, in an endeavor to save time, have left the pathway. Then it is that, unless we have a compass, or know how to read nature's signposts, we may wander about aimlessly for hours.

But we need not be lost in the wood, for nature has supplied us with an unfailing series of signs, which, if known and studied, show us the north, south, east and west as clearly and truly as any compass.

Find a full-grown tree that stands slightly apart from its fellows. Now carefully look at the bark. It will be harder, lighter and drier on the south side; while on the north side it will be considerably darker in tone, and often at the roots on the north side we shall find a clump of moss. Nearly all hardwood trees, such as the oak, the ash and the elm, have moss growing on the north side; while on that side the leaves are longer, of darker green,

and have lighter veins than those found on the south side. One of the surest ways of discovering the compass points is to find a sawn or cut stump. The rings of wood in the section will be found thicker on the south side than on the north, so that the heart of the stump is nearer the north side.

Stones that have rested in the same spot for some time usually have moss on the side facing north, while at best on the south side we shall find only a thin covering of harsh, half-dried moss. On the north side of a hill, ferns, mosses and late flowers grow, and this side is at all times greener with vegetation. In winter nests of insects will be found in the crevices on the south side of trees with rough bark.

If we are on a marsh, small bushes will act as compasses, their leaves and limbs showing the same differences as we have seen on the trees in the wood. The main thing is to have confidence in ourselves and keep from becoming panicky. If we remember these simple rules, and keep on in one direction, we shall soon get out of the wood.

THE MAGICIAN'S JACKET

IT is always well for a conjurer to give his trick a name that is likely to deceive his audience, and we may impress our friends by calling the trick we are about to describe the "magician's jacket."

The magician's jacket has nothing magical about it at all. It is only an ordinary jacket such as any boy wears. In this trick it is not the conjurer who really does the trick; it is the member of his audience whom he asks to assist him, and who acts as an accomplice quite without knowing it. The trick is that the conjurer asks anyone of his audience to tie his hands together behind his back with a piece of strong string, and after he has had his hands securely tied he takes off his jacket, and afterward shows that his hands are securely tied, just as they were before. This looks impossible; but we shall see how it can be done easily.

The conjurer takes a piece of string. It should be rather hard string—not the soft, pliable kind—but need not be too thick. The length should be about 18 inches. He then asks someone to tie one end of it round one of his wrists, as seen in picture 1. Then, putting his two hands behind his back, he asks that his other wrist may be tied with the other end of the string in the same way, leaving just a few inches between the two wrists. It is while this is being done that the conjurer manages so that the friend

who is making the knot acts as an unconscious accomplice. While the second wrist is being tied, as seen in picture 2, the conjurer pulls the two

wrists apart, so that the string between them is quite tight. This causes the friend, unknown to himself, to tie a slip-knot, which, however, does not look like a slip-knot. Now comes the anxious time. First, the conjurer asks someone to fold his jacket back from his shoulders, as he cannot get his hands to his own shoulders. Then he stands back a little distance, so that the audience may not detect what he is doing. He puts one finger of the hand that was tied first behind the knot of the second wrist, as seen in picture 3, and a little pull will enable him to widen the loop round the wrist, so as to be able to withdraw the wrist from the loop. When he has done

this, his two hands are no longer tied together, but he must be careful not to let the audience see this. He pulls off his jacket without showing his hands, and, as the jacket falls behind him, he must be careful to replace his free wrist in the free loop before showing that he has succeeded in getting his jacket off.

The best way for him to do this is to go down on his knees with his jacket behind him, and to do it while his hands are concealed by his jacket. Then, when he has got his wrist in the loop again, and has pulled up the loop tight as it was



1. One wrist tied.



2. Both wrists tied.



3. Slipping the hand.

before, he comes forward, with his jacket in one hand, and receives the applause which he deserves. He asks the friend who tied the knot, and anyone else who cares, to examine it, and say if it is as it was before. Then he asks someone to cut the string from his wrists.

This is an entertaining trick, and practice will enable any man or boy to hold his wrists so that

his friend cannot help making a sliding knot. But it should be practiced a few times before being shown in public. Nothing is more damaging to the reputation of a conjurer, whether professional or amateur, than a clumsily performed trick, and a little time spent in acquiring perfection is always advisable. A boy should do a trick well in private before performing in public.

ANSWERS TO THE PROBLEMS ON PAGE 1151

1. The price of 1 horse equaled the price of 2 cows, so that 9 horses and 7 cows would be the same price as 25 cows. If 25 cows fetched \$1,500, each cow was worth \$60, and as each horse was worth double, the price of each horse was \$120.

2. The third boy was right. When the ninth man went in, the eighth man was still batting, and the eighth, ninth and tenth men had to go out.

3. The difference between 5 per cent and 20 per cent is 15 per cent. The difference upon the article purchased was \$3, so we must find of what sum \$3 is 15 per cent. Three dollars is 15 per cent of \$20, so that the marked price was \$20, which would have been reduced to \$16 during the sale, but only to \$19 after the sale was over.

4. Sixty per cent of $62\frac{1}{2}$ cents is $37\frac{1}{2}$ cents, so that for tea that costs the grocer $62\frac{1}{2}$ cents he had received $62\frac{1}{2}$ cents + $37\frac{1}{2}$ cents, which equals \$1. The bankrupt paid $62\frac{1}{2}$ cents on the dollar, so as this amount was the grocer's cost price, the grocer lost nothing.

5. Since the whole piece of bacon and 10 eggs cost as much as half the bacon and 25 eggs, it is clear that half the bacon equals 15 eggs and the whole piece of bacon equals 30 eggs. As 50 eggs were offered with the bacon for \$1.60, the same sum would buy 80 eggs ($30 + 50$). Thus the eggs were two cents each, so that the 50 eggs offered with the bacon represented \$1. Thus the price of the bacon may be known by deducting \$1 from \$1.60, and it was therefore 60 cents.

THE PUZZLE OF THE MILLER'S SACKS

A MILLER had some sacks of flour, each sack bearing a number. He arranged them as shown in the picture, which, as will be observed, shows a set of three sacks in the middle. Next these on either side is a pair of sacks, and on the far side of each pair is a single sack. Now, something curious may be observed about the figures. If we multiply the number on the left-hand pair, 28, by the number on the single sack next to it, 7, we get as a result of the multiplication three figures,



196, which is the number on the three sacks in the middle. But if we multiply the number on the remaining pair, 34, by the number on the other single sack, 5, we do not get 196.

The problem set by the miller to his friends, as given in Canterbury Puzzles, is to place the nine sacks, with as little trouble as possible, so that each pair, when multiplied by its single neighbor, will make the number in the middle. The solution will be found in the section beginning on page 1391.

HOW DID THE KING'S JESTER ESCAPE FROM PRISON?

LONG ago, when every king had his jester to make jokes and amuse him and his courtiers by saying funny things at table, one king got it into his head that his jester was a wizard. That was the time when people suspected of being wizards or witches were put to death; and the king cast the jester into prison.

While there in his dungeon high up in the castle, the jester's nimble wits tried to find a way of escape for him. The difficulty was that the window of the prison was so high above the moat that even if the iron bar were removed from the window, and the jester could manage to squeeze his body through it, the distance was too great to jump, and the walls gave no foothold. So that this way of escape seemed to be quite impossible.

In peering all round the prison where he was, the jester, to his delight, found a piece of thick

rope hidden away in the darkest corner. A rope was just what he wanted. But, alas! it was far too short to reach the ground.

What was he to do? In his Canterbury Puzzles Mr. Dudeney tells how the jester managed to reach the ground with the short piece of rope.

He remembered hearing the story of the Irishman who had a blanket that was too short for him, and lengthened it by cutting a yard off the bottom and joining it to the opposite end. That was just an Irish tale, but it gave an idea to the jester; for he divided the rope into two halves and fastened the two parts together again, and so he was able to let himself down from the window by the rope.

But how did the jester manage to make the rope long enough to reach down to the ground? The answer will be found in the section beginning on page 1391.



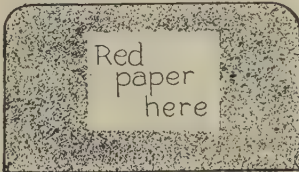
THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 1391.



MORE WORTHWHILE GAMES

CONTINUED FROM 1022

Color card



Fruit and vegetable cards



Front



Back



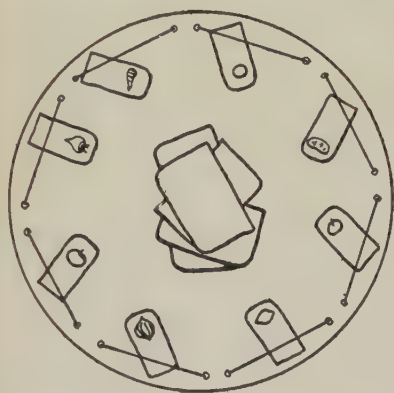
THIS picture of cards tells you about a new game. Yes, it is a color game. And what else? A fruit and vegetable game. You know that apples, oranges and bananas are fruits, and lettuce, potatoes and carrots are vegetables. Now look at the picture again. On pages 5 and 6 of your Work Book are some pictures of fruits and vegetables for you to make a game like this. You may color the red fruit and the red vegetable with your crayon if you like, and then paste each one on a gray card. A card three inches wide and six inches tall is a good size.

Paste the picture up at the top of your card. Then on the other side of the card put an inch square of red paper down in the bottom corner. When you are playing, the little red piece will be hidden down in your hand, and the pictures will show plainly. You will find the red-colored paper at the back of your Work Book.

The big piece of red paper* goes on a gray card a little longer and a little wider than the fruit and vegetable cards. It is four

inches tall and seven inches long. Now you have a color card, a fruit card and a vegetable card for red.

Can you think of a fruit and a vegetable that are orange-colored? Make a big card for orange as you did for red. Color your orange fruit and vegetable and mount them on cards just as you did the red apple and the red beet, and put little squares of orange paper on the backs of them. Then try green, or purple, or yellow, or brown. When you have made as many as you can think of, put away your things, except the cards you have just made, and get out your big wheel.



PUT the cards in the wheel as they are in the picture. If you are the leader, you pull out a card from the pile in the centre. Don't let the other children see the color, but tell them what color you have taken. See if they can find one fruit and one vegetable that grow that color. If you say: "Joe, find the red fruit," and, "Polly, find the red

vegetable," they must look over all the cards until they find the right ones. Perhaps Joe says: "Here is a beet. It grows red." But Polly may say: "I'm to get the vegetable: the beet is a vegetable. That's my card." Then Joe will have to hunt for the red apple. A good leader always sees that each child plays Just Right, and if someone doesn't know the game well enough to do Just Right, the leader shows him how. If Polly and Joe each find the card you tell them to get, they keep them for their scores in the game. If either of them finds the wrong card, he must put it back in the wheel. At the end of the game the child that has found the most cards wins the game. Better draw a picture of the game at the top of the score page. And be sure to draw a ring around the best score you make in the game.

If you can play very fast without getting cross or rough, it is fun to play it this way. When the leader says: "Find the red fruit," the first one to find the apple and tell about it gets the card to score.



other side

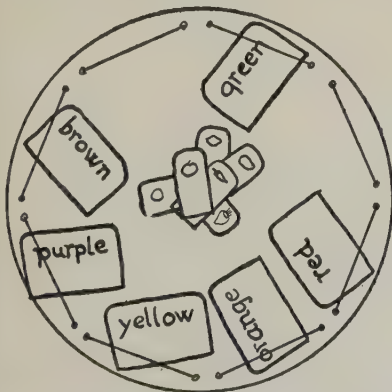
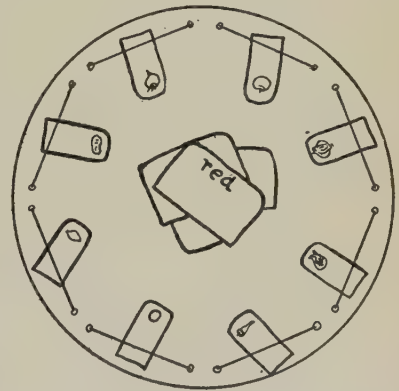


WHEN you can play this game Just Right, mount the name of each color on the other side of the big card. You will find the words on page 7 of your Work Book. Put the word high up on the card, just as in the picture. Then cut the top corners round so you can easily and quickly see your word right side up. Be sure you get the right name word for each color. You can do this by turning to page 139 of your

Work Book and looking at the picture there.

NOW see if you can play your fruit and vegetable game one of these new ways. Put the word cards in the middle this time. When you are leader, pull out a card, perhaps the bottom one, and put it on top. Do it carefully so that no one can see the color on the other side. And don't anybody tell what the word says. See who can find a fruit or vegetable that grows the color the word says.

You can tell who is right because the color on the other side tells what the word says. And besides, you put the same color on the back of the fruit and vegetable that you put on the big color card. So you can surely tell who is matching right, and a good leader is very careful about that. He looks on the back of every card to see if it is right.



HERE is a still harder game with the same cards. This time put the big word cards in the outside tapes. Put the little cards in a pack in the middle, with the pictures up. When it is your turn, pull out a small card from the pile in the middle and find the word card that tells what color it is. If you turn up a potato, you could say: "A potato is

LEARNING TO WRITE

The First Time



Tracing script card
with first two fingers.



Turning the card over.

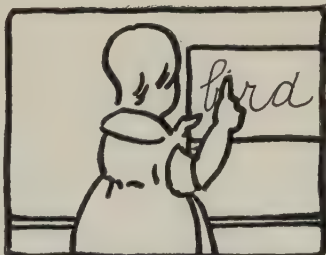


Writing part of word.



Erasing incomplete word.

Try Again



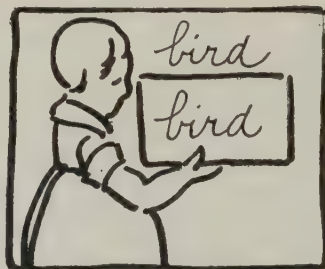
Tracing word card again.



Turning card over.



Writing complete word.



Matching writing
with script card.

brown. This says brown." Then turn over and look at the color on the back to see if it surely does say brown. You know how to score all such games now, so put down your score.

If you can score well on all these games in which you read the color words, of course you could play a writing game, too. On pages 7 and 8 of your Work Book are the



color words, the way you write them. Mount them on your word cards. You remember you put the printed words high up on the card. That leaves plenty of room to put these written words on too. By matching these words you will be sure to get the right word on each card.

red

red

orange

orange

yellow

yellow

brown

brown

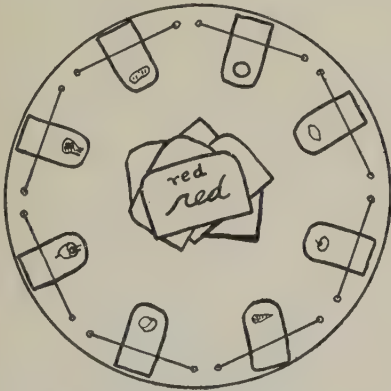
green

green

purple

purple

Now you are ready to play. Bring your blackboard if you have one. If not, get some wrapping paper to write on.*



PUT the cards in the wheel as in the picture, so you can see the pictures of the fruits and vegetables. When it is your turn, take up the pile of big word cards and take out one. Be sure that no one sees either the word or the color on it. Trace the word quickly, as the child is doing in the first picture on the page across from this, and then write

it on the blackboard or paper. See if the children can find a fruit or a vegetable that grows the color you have written.

How will you score this game? You want to score yourself for writing the word so well the children can read it, and they want to score for finding the picture that matches the color. Which do you

* Help the child to do his first tracing so it will be the most help to him later. Look over the directions on page 1290, and without talking much about it, help him to start these habits now. From the printing office or paper house, unprinted newspaper can be purchased for this early writing.

think earns the bigger score? Yes, I think you score two when you write well enough so the children can read. Whoever finds the right cards, each scores one.

Perhaps the children cannot read the words you have written even though you have written them quite well, just because they do not know what the words say. And perhaps you cannot read the words they write. Here is a way you can learn to read written words.

Take a pile of your word cards and cover up the top part with a piece of cardboard, so you can see only the written word. Try to say it. If you cannot, then pull it out and look at the printed word which you already know. If you are not quite sure, look on the back to see if you are right. You will soon read every one of your written words as well as the printed ones.

You see there are many different ways to play with the game cards you make. And all the time you are learning something more. I have been telling you some of the ways my children play. You can think of other ways that are just as good, and perhaps more fun than any of these ways.

In these games you need both to read and to write, don't you? If you want to write more or write better, you can practice up all by yourself. You can practice tracing and writing the words until you can write them so they say the same as the words on the cards.

Do you see how the child in the picture on page 1290 is learning to write? Trace several times with your first two fingers, just as though you had a pencil or crayon in your hand; then turn the card over. Write the word as fast as you can. If you forget how, just stop and rub out what you have written and trace some more. When you can write it off quickly, all of the word, look again at the card to see if you have it right. You can soon learn to write both fast and right.

But remember, you must not try to go fast in writing or in any games, until you learn to do them Just Right. When you practice, keep score of the word cards you did Just Right, after one tracing. Draw a ring around your best score each day and you will soon see that you are writing better and better all the time.



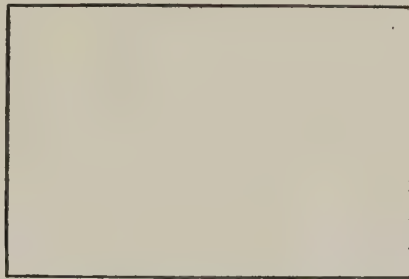
THE child in the picture is learning to write. He has made himself an easel. So he fastens his paper up with thumbtacks and writes with a crayon just as he writes at the blackboard. He writes this way when he wants to keep his writing. It will be fine if you can make one too. Or perhaps big brother or father will help you.

You will have to have six pieces of wood and two hinges. The picture shows what shape they are. The writing-boards are about two feet wide and three feet

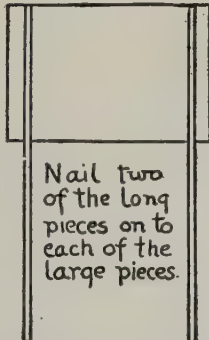
long. They are one-half inch thick.

You may be able to nail the pieces together as the picture shows, but you will surely have to have some grown-up put on the hinges for you. Then you

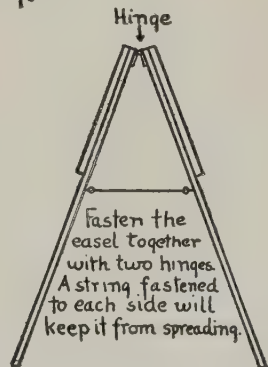
Four pieces 5ft long, 2 inches wide.



Two pieces 2ft. x 3ft.



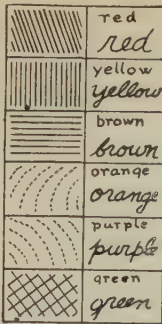
Nail two of the long pieces on to each of the large pieces.



Fasten the easel together with two hinges. A string fastened to each side will keep it from spreading.

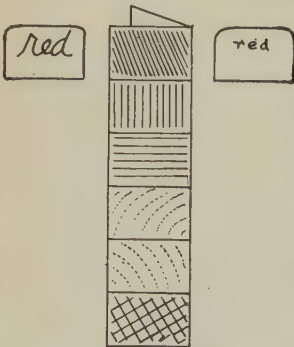
You see there are two sides to this easel, so you can have a playmate write on one side. I

know you will find this easel will make the learning more fun.



If you need to practice on reading the words, here is a game for you.

You can play it all alone. Take a card a foot long and half a foot wide. (Half a foot is the mark in the middle of your foot rule and is marked "6.") Turn the card as it is in the picture and measure down two inches from the top and draw a line, as in the picture. Then measure down another two inches and draw another line.

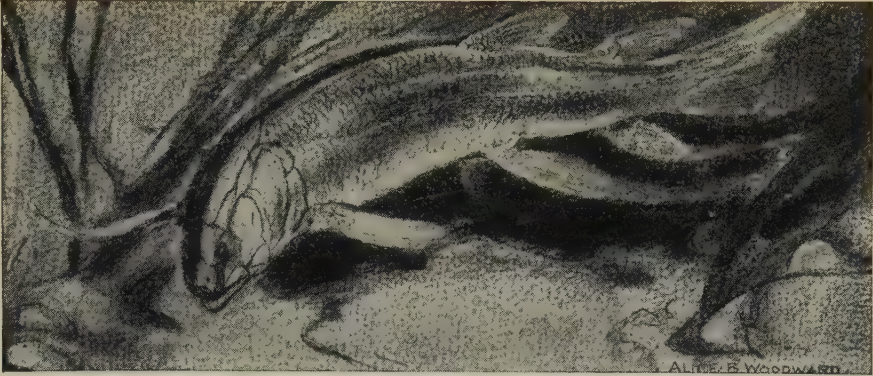


Do this over and over until you have drawn five lines. Then draw a line down the middle and you will have five spaces on each side of the line. Now look at the top picture on this page. The different kinds of lines mean that a different color is to go in each space. Cut an inch square piece of each color and paste it

next to the word that says what color it is. You can make your card look like the picture on page 139 of your Work Book.* At the back of your Work Book are the colored papers that you are to cut, and on page 9 of your Work Book are the words. When you have made your card, fold it down the middle, as in the picture. Be sure to put the right word with each color. Then put this big card away while you make the little cards. Cut the little cards two inches one way and three inches the other. Mount the words on them just as the picture shows you. You will find the words on page 9 of your Work Book. Round the top corners. Now you are ready to play.

The first time you use the game look at the first color and then find all of the words that say that color. Next, fold the big card so you can't see the color words and match as many of the little word cards as you can to the colors. When you have done the best you can, open out the big card and match to see how many you have right.

* Note to parents: Cut small bits from the pages of color, at the back of the Work Book, and yourself paste these neatly over the squares where they belong in the drawing on page 139 of the Work Book. This will guide the child in making the color card described above.



One of the seven hundred kinds of fishes that lived in the Carboniferous Period.

THE CARBONIFEROUS PERIOD

THE Carboniferous rocks are found all over the world, sometimes in small patches and sometimes in huge areas. In England, France and Germany there are usually small areas of this rock, while in Russia, China and North America there are sheets of such rock spreading over thousands of square miles.

There are two main types of rock in the Carboniferous system: the limestone, built up in the sea by various coral-forming animals; and the sandstone and shale rock, formed in shallow lakes and lagoons. Rocks of both types are found in the Carboniferous of North America. The second type is most important because it includes the useful coal beds. Because geologists used to think that these were the only coal beds, the age was called Carboniferous. To-day coal has been found in all the later periods also.

The change from the Devonian was usually quite gradual, but great upheavals and wearing-away of rock marked the close in Acadia and Maine. The land of New England, Canada and Newfoundland overlooked a Gulf of St. Lawrence much greater than at present. Here are sandstones, conglomerates and limestones 6,000 feet in thickness. Southwestward sandstones and shales are 4,000 feet thick,

CONTINUED FROM 1177



but they become thinner to the west. The Mississippi Valley was once a great interior sea and built up from 1,200 to 1,500 feet of limestones. These reached into Missouri, Arkansas and Texas.

There are some limestones, shales and coal in the Lower Carboniferous of Virginia and Nova Scotia. So far but little coal has been provided for.

In the midst of this age came a great gentle heaving-up of the eastern ocean floor. Heavy sandstones or mill stone grit was laid on the lower rocks, and broad lands of a low, swampy nature were along the new shores. This kind of land occupied all Nova Scotia, Pennsylvania, West Virginia, eastern Ohio, parts of Tennessee, Kentucky and Alabama. Gradual sinking permitted a tremendous accumulation of dead plants. A twenty-foot seam of coal means at least 300 feet of dead plants. Nova Scotia has over seventy-five different coal seams, and the total thickness of these Upper Carboniferous beds, including sandstones and conglomerate, there amounts to 13,000 feet. In some places, owing to tremendous pressure, the coal became anthracite.

Rocks of the Carboniferous periods are found westward to California and British Columbia; but west of Nebraska they are usually deep-sea rocks,

and they show 13,000 feet of sediments in Utah and Nevada.

The animal life of the Carboniferous Period was various. In the rock laid down under the sea we find crinoids, corals, foraminifera and brachiopods; and great masses of the limestone are composed of the skeletons of these creatures. More than seven hundred kinds of fish have been found. The fish were mostly sharks, and most of them had flat-crowned teeth adapted for crushing the shells of the creatures on which they lived. In rocks formed in the marshes and lagoons over the land are found numerous small fishes, crustaceans and molluscs.

Among land animals are found cockroaches, crickets, beetles, locusts, mayflies and dragonflies; even bugs and walking-stick insects. But, so far, there were neither flies nor moths, neither butterflies nor bees. Scorpions were plentiful, and there were a few crustaceans of the crab and lobster family, and many species of millipedes and spiders.

THE JUNGLES AND FORESTS OF THE ARCTIC REGIONS

But perhaps the most interesting fossils found in the Carboniferous rocks are the labyrinthodonts, so called because of the peculiar structure of their teeth. They were the first amphibians, and many species have been identified. They had heads covered with bony plates, long bodies and weak limbs, and they varied in length from a few inches to seven or eight feet. No reptiles have been detected in the rocks of that time, but some footprints found in the coal of Kansas look like the prints of a reptile's feet.

Plant life was very abundant in the Carboniferous, and there were forests extending over a considerable part of the earth; but there were no flowering plants. We find remains of the great forests particularly in Britain, Germany, China and North America. Even in the Arctic and Antarctic regions remains of jungles and forests are found.

The vegetation of the age was luxuriant and rank, and some geologists and botanists think that the atmosphere was then much richer in carbon dioxide, and also much warmer, than now. There is no proof, however, that there was more carbon dioxide. But the climate must certainly have been mild and moist, and very similar everywhere.

THE CLUB-MOSSES THAT GREW INTO TREES SIXTY FEET HIGH

These Carboniferous forests and jungles were not like the forests and jungles of to-day. They consisted almost entirely of giant ferns, giant mosses, and giant horsetails, with a few trees here and there. The humble club-mosses which to-day creep upon the ground were represented by lepidodendrons growing fifty or sixty feet high; ferns grew into trees almost equally high; while there were dense thickets of enormous horsetails known as calamites.

This vegetation, which flourished so many years ago, has been of the greatest importance to modern man. Without it modern civilization and industry could not have been; for most of the coal in use to-day is formed from its decayed and compressed remains, now found in the Carboniferous rock in layers a few inches or a few yards thick. Most of it, in America, formed in the place where a forest flourished.

In coal we sometimes find leaves and spores and stems of the trees of that bygone age, and when we burn coal we are really burning the trees of these ancient forests, and setting free the energy of the sunbeams stored in their wood.

THE REPTILES AND AMPHIBIANS IN THE ROCKS OF THE PERMIAN PERIOD

The Carboniferous lands slowly rose, dried out and the plant life began to change. Lepidodendrons died down; calamites, tree-ferns continue; and yews and ginkgo appear. This was the Permian Period, which belongs partly to the Palæozoic and partly to the Mesozoic eras. The rocks are found from Nova Scotia to West Virginia, and westward to Nebraska and Texas, where they are thickest. The rocks west from Texas are usually those of inland seas. They consist sometimes of red sandstone and sometimes of limestone and dolomite.

The animal life of this period is found chiefly in the limestone rock. It very much resembles the animal life of the Carboniferous Period, but most forms of life are much less plentiful. Amphibian life is, however, more abundant, and many true reptiles have been found, especially in the Texas beds. The plant life of the Permian is also comparatively scanty, and most of the plants are found also in the Carboniferous rocks.

THE NEXT STORY OF THE EARTH IS ON PAGE 1401.

A VISION OF THE CARBONIFEROUS PERIOD



The luxuriant vegetation of the Carboniferous Period—ferns, mosses, horsetails; and some of the animal life of the period, including an archegosaurus and a fish.



A cutting through Permian, Carboniferous and Devonian strata. In the Carboniferous stratum are seen fossils and stumps and branches of trees in a coal seam.

THE SPLENDID BRIDAL ALTAR IN THE MAMMOTH CAVE



Among the myriad splendors of Kentucky's Mammoth Cave is this famous formation called the Bridal Altar. Although about 150 miles of passageways have already been explored in this underground region of wonder, many miles still remain unseen.
Photo, Abel & Company, Inc., courtesy of the Mammoth Cave Estate.

WHAT THIS STORY TELLS US

WHEREVER the rock under the soil is limestone we shall find caves. Water easily dissolves this stone and washes it away. Much of Kentucky lies over limestone, and in that state we find the Mammoth Cave, the largest in the world. It is not one cave, but dozens on different levels connected by passageways. There are lakes and underground streams, some of which are connected with the Green River, which flows above ground not far away. In these caves, both on the floors and in the water, are curious insects and fish which have lost their eyes from living so many generations in darkness. In this story we shall learn of the wonders of this great cavern.

WONDERFUL MAMMOTH CAVE

THE world is full of natural curiosities, more wonderful than anything of man's construction. Few countries are richer in natural wonders than the United States, which contains so many; and not least among her treasures is Mammoth Cave, probably the largest cavern in the world. It is situated in Edmondson County, in the west-central part of Kentucky, in the limestone region, and has been hollowed out by water which has dissolved the limestone. During the War of 1812 it supplied the country with a considerable quantity of saltpetre used in making gunpowder. At present it is a point of pilgrimage for tourists from all over the world. The unchanging darkness, the colossal grandeur of its proportions, its vast silences unbroken by the raging of storm and thunder without, make the cave a thing apart from all our other experiences. At all times of the year, winter and summer, spring and autumn, the temperature of the air remains the same, fifty-four degrees. Its cool dampness never varies, although the sun outside may be baking the atmosphere to a fervid heat, or the snow lie knee-deep upon the ground. So majestic and sombre is the blackness of the place that it often has an unpleasant effect upon the nerves of visitors.

It is hard to realize that not so much as even a ray of light has



ever penetrated these gloomy caverns in all the ages since they were hollowed out. In its inky pools and cascades there are fish and crayfish that have no eyes. Long ago through underground streams their ancestors wandered into this world of darkness and silence. Gradually, through lack of use, their sense of sight became dulled and finally disappeared altogether. There are two varieties of these fish. One has no organs of sight, while the other has rudimentary eyes that have lost all power of seeing. Their color has also faded out as the generations have passed. There are about thirty other kinds of life—mostly of the lower orders—to be found in the cave, including crickets that have faded into a pale and sickly hue. Bats are also found in great numbers. There is one chamber called the Great Bat Room, where these little creatures cling in thousands to the walls and ceilings. "They are cold to the touch and when seized between the thumb and finger they shrug up their shoulders, move their wings lazily and perhaps utter a feeble cry."

The cricket is a long-legged variety that looks something like a spider. "These are everywhere, and when they die they remain where they happen to be on the wall, while a white fungus covers them with a thick shroud till they look like snowballs with

legs. Some varieties of mushrooms have also been found, and the attempt to cultivate them for market has been made.

"In one of the vaults there are also mineral 'snowballs,' as the ceiling is of gypsum crystals. Farther on, the gypsum takes the form of flowers, chiefly marguerites, sunflowers and regal chrysanthemums, though roses, too, may be found and the graceful forms of

can make out the great walls of rock and the massive roof rolling into domes and arches overhead. Someone shouts and the sound comes thundering back from the vast rocky caverns stretched out before us. It is a full minute before the echo dies away. As soon as you can still the thumping of your heart you follow the guide into the Vestibule, or Rotunda, a great hall, which covers an area of one and a half



THE ENTRANCE TO MAMMOTH CAVE

The entrance to the great cavern is not at all striking. From a little clump of small trees a broad incline leads down into the earth. At one side is a flight of steps but the remainder of the incline is covered with autumn leaves which have drifted in. The picture was taken from inside the cave.

celery tops. The 'Vale of Diamonds' and the 'Jewel Chamber' are bright and sparkling both on ceiling and walls."

Let us take a trip through some of the most wonderful parts of this underground world. You enter by a flight of steps which passes under a great archway into the darkness. A guide holding a flaring torch on high leads the way. You follow him through the Narrows into the Great Main Cave. For a few minutes you feel stunned by the vastness and strangeness of this new world into which you have come. By the flickering light of the torch you

acres of ground. The Great Vestibule was one of the chief workrooms for the manufacture of saltpetre which played so important a part in the War of 1812. The floor is strewn with heaps of nitrous earth and ruins of workmen's vats. We look up at the rough crystal-hung ceiling looming above, and wonder how high it can be. The singular purity of the atmosphere makes it hard to judge, but the guide says that it is 125 feet from the floor in some places.

The cave is not one great room, but dozens, which are connected by narrower passageways. Without a guide

THE CAVERNS OF MAMMOTH CAVE



Here is a picture that will give you something of an idea of the vastness of the underground passages of Mammoth Cave. The great cones hanging like icicles from the roof are called stalactites. Those rising upward from the floor are called stalagmites. Those in the picture are known as The Eagle's Wing.



Echo River is in some places two hundred feet wide and forty feet deep. Boats with flat bottoms are provided and visitors can float about three-quarters of a mile before the river disappears into a hole in the rock. There are several other streams in the great cavern, some of which have never been explored.

Pictures by courtesy of the Louisville and Nashville Railroad.

you might easily be lost, as these passages wind and twist and cross one another in a most puzzling way. Then, too, there are caves above caves, as there are several different levels. You might easily step off into a great hole at the bottom of which is water.

From the Rotunda we pass into Audubon Avenue, sometimes called Big Bat Room, where thousands of bats take up their quarters for the winter season and cling together like swarms of bees. Returning and passing through the Main Cave, we come to the Kentucky Cliffs—so called because of a fancied likeness to the cliffs on the Kentucky River. From here we gradually descend into a great natural temple called the Church. A Gothic roof looms over us, its hoary, crumbling arches formed from natural stone ages ago. A rock ledge rising twenty-five feet in the air serves as a pulpit. Here for the past fifty years or more the Gospel has been occasionally preached.

Leaving the Church, we climb over mounds of earth turned up for the old saltpetre works until we come to the Gothic Arcade, where we see more signs of the old mining activities. Passing on, we enter Stalagmite Hall, where mighty rock crystals like icicles hang from the lofty dome and stretch upward in peaked cones from the floor. The dripping water dissolves the limestone as it passes over the rocky roof. As the drops run down, the water slowly evaporates and leaves some of the lime. A stone icicle is formed which grows and grows. The water which falls from the tip to the floor gives up some of its lime and another cone is built up which points toward the ceiling. These stone icicles hanging from the ceiling are called stalactites; while those rising from the floor bear the name of stalagmites. From Stalagmite Hall we retrace our steps, for there is much yet to be seen on every hand. We must visit various points of interest in the miles of black halls stretched out around us, in all directions.

We must not fail to see the famous Star Chamber, which is considered one of the most beautiful things in Mammoth Cave. Here the guide leaves us sitting upon a bench by the wayside, straining our eyes into the pitchy blackness that closes in about us. Presently,

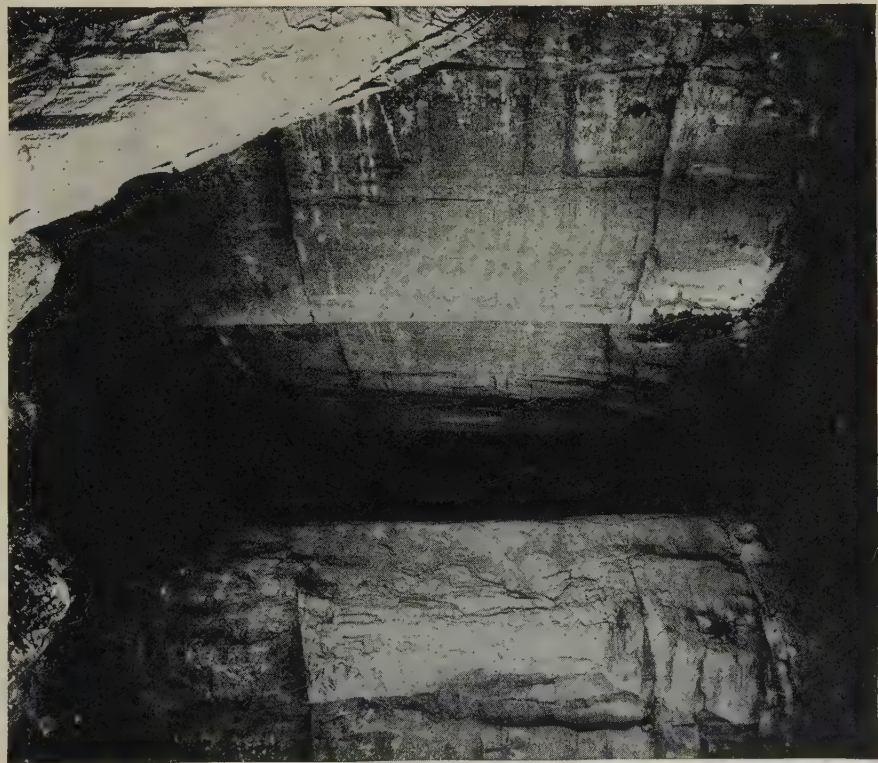
as we become accustomed to the dark, we see above us a midnight sky, with myriad tiny stars twinkling in the blue-black dome. Then the guide returns. As he does so, the stars vanish from the sky, and he explains that it is an illusion caused by partially covering up his lantern and letting the rays of light play upon the stone crystals overhead.

In one portion of Mammoth Cave we come upon a little deserted village of roofless stone cabins, where many years ago a number of consumptives took up their home, hoping to be benefited by the stationary temperature. They entered the cave in the month of September. In January they tottered out, white and bloodless from their long absence from the sun, and most of them died soon after. This proves, as stated in another part of this book, that the sun is a great life-giver, and when removed from its rays, neither men, animals nor plants can live in their most healthy state.

Several rivers, among them the Styx and the Echo, find their gloomy way through the darkness. We embark on a flat-bottomed boat and paddle slowly down the Echo River. The rock ceiling under which the water runs is so low that at times it almost touches the tops of our heads, two and one-half feet only above the current flowing darkly underneath. As the boat slips along, suddenly the guide raises his voice and runs down the scale of notes. Slowly the tones grow and swell until they come booming back from the cavern rocks in a rich and perfect accord. A feeling of awe settles down upon us. The solemn silence that, broken by the halloo of a man, resounds with a deafening roar—the flickering light of the torch flames upon the grand rock walls and the unearthly stream that flows silently under the stern of our boat cannot fail to impress even the dullest mind.

So wonderful is the echoing quality of the rocks in portions of Mammoth Cave that many writers have spoken of the subject. John Burroughs says: "Another surprise was when we paused at a certain point and the guide asked me to shout or call in a loud voice. I did so without any unusual effect following. Then he spoke in a very deep

MASSIVE AND BEAUTIFUL STRUCTURES BUILT BY NATURE



These formations are known as the Mammoth Dome and Pompey's Pillar. Of all the great chambers in the Mammoth Cave some think that the Mammoth Dome is the finest. Its total height is 285 feet, and in it is a cataract falling 150 feet. Beyond this dome extends the Egyptian Temple, in which stand six tall impressive columns.

Photos, Brown Bros.

bass, and instantly the rocks all about and beneath us became like the strings of an Æolian harp. They seemed transformed as if by enchantment. Then I tried but did not strike the right key; the rocks were dumb. I tried again, but got no response; flat and dead the sounds came back, as if in mockery; then I struck a deeper bass, the chord was hit, and the solid walls seemed to become as thin and frail as a drum-head or as the frame of a violin. They fairly seemed to dance about us, and then to recede from us. Such wild, sweet music I had never before heard rocks discourse. Ah, the magic of the right key!"

We must now pay a visit to the "Maelstrom," a huge black pit stretching thirty feet around, whose weird yawning mouth makes us draw back with an exclamation of dismay. The guide tells us that a young man, in a daredevil mood, persuaded some friends to lower him by a rope into the pit. Although he escaped without any bodily harm, it is not reported that he ever desired to repeat the experiment. His adventures in the horrible hole were described with great gusto by all the Louisville papers at the time.

There are many other underground halls of weird beauty and interest that we might well see before we leave Mammoth Cave—such as the Giant's Coffin, the Dead Sea, the Fairy Grotto, and Lake Lethe, a broad basin of water enclosed by walls ninety feet high—but we will confine ourselves to a visit to Mammoth Dome, where we shall find a tier of colossal columns that have won for themselves the name of the Hall of Karnak, from their resemblance to that Egyptian temple. For a minute the grandeur and silence of the place almost takes our breath away. Six huge columns, eighty feet from the top to bottom, and twenty-five feet through, support the roof. The gray of the stone is all covered with a coating of "yellow stalagmite, rich as jasper, and covered by tracery as elaborate as Chinese carving. The capitals are projecting slabs of limestone, and the bases are garnished by mushroom-shaped stalagmites." "How wonderful!" we exclaim, as we come slowly to the realization that these mighty pillars were reared by the unaided hand

of Nature. "How wonderful!" And our eyes travel from the massive columns to the stalagmite blocks of red and black that pave the floor in a mosaic pattern. "In looking up, one thinks of great cathedrals, or even of the perpendicular sides of some Western cañon; and although the dome is only one hundred and fifty feet away, it seems far higher."

We leave the dark and gloomy labyrinths of Mammoth Cave through a passageway rightly termed the Corkscrew. When at last we step out of the darkness, it is as if we were stepping from an "ice cellar into a Turkish bath, and the pure air of the Kentucky forests seems as laden with rich odors as a greenhouse, and for the first time we realize what an abundance of odors exist in ordinary air. It does not seem probable, however, as is often asserted, that there is anything especially exhilarating in the Cave air itself, as there is in mountain breezes. It is simply the purity and the coolness of this atmosphere that enable one to take the seventeen-mile trip underground without special fatigue." As we draw in a breath of the out-of-door air and glance around once more upon the world of wind-shaken leaves fluttering in the sun, upon a universe fairly ahum with life—the drumming of locusts, the song of a bird, the lowing of distant herds—we awake with a kind of shock from the unearthly strangeness of the place we have just left. "No vicissitudes of earth," writes John Burroughs, "no changes of season, no sound of storm or thunder penetrate there; winter and summer, day and night, peace and war—it is all one; a world beyond the reach of change, because beyond the reach of life."

We linger a while near the entrance of the cave to accustom our eyes to the searching yellow sunlight, and as we do so we grow used to the warm wind that sweeps to us through the woods, which, as we have said, seemed at first so hot and sticky after the pure, cool atmosphere of the underground world. Finally we cross our rocky platform, reluctantly turning our backs upon the fascination of the open mouth of the great cavern, and climb the forest footway into the world of sunlight and color.

The Book of Familiar Things



Forks and spoons at various stages, with the dies by which they are stamped out.

A TALE OF A KNIFE AND FORK

FOR ages and ages men never dreamed of having knives and forks.

The first sort of knife that they used was probably the sharp edge of a shell, gathered on the beach where they caught the shellfish which formed their food. By and by they improved on this, and made knives and axes and spear-heads of hard flint stones.

The men of the Stone Age used their flint knives for cutting up the flesh of the animals which they had caught, just as the Indians did when the white men came to America. They did not need forks. The fork, which grew out of the spear, came a long time afterward. The first forks were used to spear fishes, and were made with three prongs, of which the two outer prongs were barbed. If we want to see what they were like, let us look at a pickle fork, and imagine it to be made, on a much larger scale, of flint or bone, or even of some hard wood.

Later on forks were used in cookery, and then centuries passed before any one thought of using them at the table. It is almost certain that Queen Elizabeth and the ladies of her court ate with their fingers; and it is more than likely that our ancestors of the time never saw a fork smaller than those

CONTINUED FROM 1219



they used in cooking and serving meat. It is said that the luxurious Venetians

used table forks in the eleventh century, and Charles V of France had a few forks for his own use in the fourteenth century; but probably forks with which to eat food did not become known in Great

Britain until the seventeenth century, when they were brought by a traveler from Italy. Until then, in the king's palace and in the noble's mansion only the man who carved the joint would have a fork to help him. Even to-day the Persians and the Egyptians eat with their fingers and think that Americans and Europeans are very queer people to prefer using forks, and, as we know, most of the Chinese and Japanese still use chop-sticks.

In England Sheffield is the great place for cutlery. London and Birmingham once had a big share of the trade, but during the last hundred years the Yorkshire city has so largely increased its manufacture of knives and forks that it has left its rivals in this trade far behind.

CUTLERY-MAKING ON THIS CONTINENT BEGAN IN NINETEENTH CENTURY

Germany has long been noted for its cutlery, which is chiefly made in

Solingen, a town near Dusseldorf, which has been famous for centuries for its swords.

It is probable that some knives were made in America in the early days of its settlement, but if so, their number was small. The making of cutlery in sufficient numbers to term it an industry, was not commenced until the nineteenth century. The first cutlery factory in the United States was opened in Worcester, Massachusetts, in 1829. Three years afterward the making of table cutlery was commenced in Maine, and ten years later than that the manufacture of pocket-knives began in Connecticut.

There is not in the United States, as in England, France and Germany, one great manufacturing centre for cutlery. A good deal is made in the states of Massachusetts, New Jersey and New York, and there are also factories in New Hampshire, Connecticut, Ohio and other states. Little cutlery is made in Canada.

MANY KINDS OF CUTLERY MADE IN THE UNITED STATES

The ordinary silver-plated knives and forks which we use so generally are made in the United States. So are very large numbers of pocket-knives, a large proportion of the scissors that we use, and a great many other things that come under the general name of cutlery. Some of our fine scissors and a great many surgical instruments come from abroad; and immense quantities of very cheap knives and scissors have until recently been sent to us from Germany, where they are made at a very low cost.

Until recently cutlery-making in Europe has been almost entirely what is known as a cottage industry, and although there are now some large factories in Solingen, a large proportion of the cutlery produced there is still made in the homes of the men. A different system is followed in Sheffield. Here, too, there are some large factories, but in much the larger number of cases, knives or scissors or surgical instruments are made in small establishments where only a few men are employed. Except in the large factories, little expensive machinery is used, but the small manufacturers, or "small masters," as they are called, generally make their knives from steel blanks which have been forged out in large establishments. The use of these blanks saves much time in manufacture.

THE MEANING OF THE TERM "COTTAGE INDUSTRIES"

"Cottage industries," of which we have spoken, is a term given to trades which are followed by men and women in a room in their own homes, or in a small workshop built in a yard or garden. Sometimes these workers are able to sell their goods direct to merchants. As a rule, however, work is given out to them by large manufacturers or by dealers who find they can get it done more cheaply in this way than if they had to keep up a very large establishment of their own.

In the United States, where cottage industries never gained a strong footing, cutlery has from the first been made in factories, and more machinery, such as steam, or electrically driven forging hammers, dies and grinding wheels, is used. Still, a great deal of hand work is necessary to make really good cutlery, and even for the processes in which machines are used, skillful workmen are needed.

The blades for cheap knives and razors and scissors are stamped out by dies. For the better cutlery, however, the steel is cut into proper lengths and then forged, or beaten out, by heavy machine-driven hammers until it has been made sufficiently thin. After that has been done they are hardened, tempered, ground, and fastened to their handles; they are polished until they shine like mirrors, nickel- or silver-plated, sharpened and finished. The cheaper silver-plated knives, which are not very sharp and are not very flexible, are cut to the length of the knife and forged in one piece in which the handle is included.

THE MAKING OF SHEARS AND SCISSORS

It may surprise you to learn that the blades of many of our shears and scissors are made in two pieces. Very fine scissor-blades are made in one piece of fine steel and are often forged by hand. Only skillful workmen can make these scissors; the making of the "eyes" in the handles is especially difficult. Hand-made scissors are naturally expensive, and a cheaper way of making the large scissors and shears used by tailors and other workmen has been devised. The handles and backs of the blades of these implements are made of soft steel, which is brought to a white heat and forged with heavy hammers. It is then cut with dies into the shape of handles and blades.

MAKING AND TEMPERING A KNIFE-BLADE



This man is stamping knives, by means of a die, from lengths of steel which have already been forged into the correct wedge shape needed for a knife, a little thicker at the back than in front.

Two pictures copyright, Press Illustrating Service, Inc.



After the knife is cut, it must be tempered. For this purpose the steel is brought to a red heat and then suddenly cooled. Here the blade is being heated.



After the knife has been tempered by bringing it to a red heat and then plunging it into cold water or oil, it is placed upon a flat stick hollowed out for the bolster and ground as we see here.



Much care is taken in cutting up ivory tusks for handles, as ivory is very valuable; the tusks in this picture are worth many dollars. This man is sawing tusks into proper lengths for knife-handles.

When this is done, a thin plate of very fine steel is welded to the front to form a cutting edge. Afterward the blades are finished and fitted in pairs, polished, nickel-plated and carefully fastened together, ready for use.

The making of knives and scissors, even when machinery is largely used, is very complicated and includes many processes. The steel, which must be very hard, must be carefully forged. It must be tempered to make it pliable, ground to make it sharp, and after it has been hammered and beaten and ground, it must be polished so that it will keep its brightness.

Knife-handles are made of different substances. Horn, bone, ivory, tortoise-shell, celluloid, wood, silver, and even gold, are all used, and putting the knife into its handle, or hafting the blade, is a special trade. The best knife-blades, like the best scissors, are hand-forged, or beaten out from a thin bar of steel of the thickness of the back of the blade. Scissors must be so carefully put together that the blades will meet and pass each other at exactly the right angle to enable them to shear through the substance that they are to cut. Sharpening is always done by hand, and to give the knife-blade or scissors-blade a proper edge it must be held against the sharpening stone at a particular angle.

All this means a great deal of work, and you will not be surprised that the knife that you got on your birthday, or at Christmas, was put through at least a hundred different processes in the course of its manufacture.

HOW OUR SPOONS AND FORKS ARE MADE

Some spoons and forks are made of silver, some of the very cheap ones are made of brass, but the larger number are made of an alloy composed of certain proportions of tin, copper and zinc. Spoons and forks are all pressed into shape and cut with dies, and are then carefully polished and cleaned. After this has been done, those that are not made of silver are silver-plated.

For the purpose of silver-plating our forks and spoons a bath is prepared in which silver is dissolved by the aid of chemicals. The forks or spoons are suspended in the bath by copper or silver wires. They are hung in such a way that they are covered by the solution and

can be moved about in it. Then electricity is turned on, and by its means the silver is made to leave the chemical solution and adhere to the metal of which the spoons or forks are made. An interesting thing is that the anode, or positive pole, through which the electric current is sent into the bath, is made of silver. The silver of the anode is gradually broken down, or dissolved, by the current and is added to the solution, so that although the silver is constantly leaving it to cling to the spoons or forks, the bath always holds about the same proportion of the precious metal. Unless the metal in the objects to be plated is exquisitely clean the silver will not cling to them; and to make them ready for the coating they are often washed in a solution containing mercury before they are put into the bath.

After they have been taken out of the bath they are put through a number of processes, and when they are finished and packed in tissue paper, they look as if really made of silver. Not very many years ago all table forks were made of steel; and, indeed, in some places steel forks are still used: forks for campers' use, for instance, are nearly always made of steel. Carving forks are made of very fine steel, and as much care must be taken in their manufacture as in the manufacture of knives.

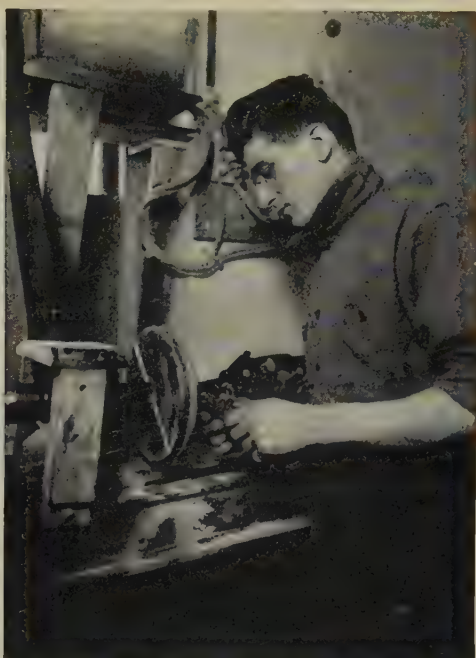
The first spoons were probably just shells picked up on the shore, and something very much like the shape of shells has been kept in spoons ever since. In the tombs of the Egyptians spoons of wood, stone and ivory have been found; probably the poorer people among the Greeks and Romans had to be content with wooden spoons, but people of wealth used bronze and silver. In the Middle Ages spoons were made of wood or bone or tin, and, as you know, wooden spoons are still sometimes used in cookery. At the end of the Middle Ages silver spoons were made for very great people, but it was not until silver became plentiful, in the nineteenth century, that people of ordinary means could afford to use silver spoons on their tables. Large numbers of spoons are still made of tin, or of iron roughly coated with tin, but these spoons are stamped out with dies and finished in the cheapest possible way. Some spoons are now made of aluminum.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 1405.

PUTTING BLADE AND HANDLE TOGETHER



This man is cutting stag's horns into handles for carving knives and forks. Stag horn is also used largely for boys' pocket-knives and large clasp knives.



This man is polishing stag-horn handles on a wooden wheel, which is covered first with leather and then with a mixture of emery and glue. After this, each handle is fitted with a metal ferrule.



This man is fitting a handle to a carving steel. You can here see plainly the rough tang which runs into the handle, and the raised part or bolster, which fits tight against the ferrule.



After the handle has been put on, the blade is whetted, or sharpened, to a keen cutting edge, on a fine wheel. The blade is then burnished and polished or plated, and the knife wrapped in tissue paper.

First three pictures copyright, Press Illustrating Service, Inc.

STAMPING OUT THE METAL FORKS



The making of a silver-plated fork is different from the process of making a knife. Here we see the melting-house, where the metal that will be turned into forks is melted and poured into molds.



When the liquid metal becomes solid, it is taken out of the molds in the form of slabs, known as ingots. In this picture a workman is holding an ingot, while others rest against the wall on the right.



The metal is now rolled out as though it were putty, by the machine shown here. Then it is cut into strips about the width of an ordinary fork and again rolled, one end being made thinner than the other.



These strips are now placed in another machine, that stamps out the rough shape of the forks, with the prong end quite solid, as can be seen by the shapes lying in the box at the side of the machine.

SHAPING THE FORKS AND SPOONS



The process of cutting the prongs is called pronging. When these are roughly stamped out, as is being done in this picture, a strip of metal is left at the tips of the prongs in order to keep these together.



Up till now the fork is flat, but at this stage the handle and prongs are bent, or curved, into the shape of the forks we use. This is done by letting a heavy hammer and die fall upon the metal shape.



This picture shows us how the bowl of a spoon is shaped in a way similar to that in which the forks are curved. The heavy hammer that does the shaping is worked by the man holding a rope.



After the curving, the fork is clamped in a vise, and the metal strip that joins the prongs is filed away. Next it is buffed, or made smooth, by being pressed against leather wheels.



Now the forks are suspended in the magic bath that gives them a silver coat. This is called electroplating, and the picture shows how the forks are suspended. They are left in the bath a certain time to receive their silver coat, and when taken out are a dull white color. By burnishing and polishing they are soon made shiny. Although simple in theory, electroplating needs great skill and experience.

HOW SCISSORS ARE MADE



The blades of very fine scissors and surgeons' scissors are made by hand from very hard steel, but the blades of the shears and scissors in ordinary use are made in two pieces. The handles and backs of these implements are made of soft steel, which is forged with heavy hammers and cut by means of dies.



Soft steel will not keep a sharp edge, and after the frame has been forged, a piece of very fine, hard steel is welded to the inside of the blade to form a cutting edge. This man is welding the pieces.



When the welding has been done, the blade is trimmed and the screw hole carefully drilled. The blade is then hardened by heating it and chilling it. When this has been done, the steel is tempered.

Pictures of scissors-making courtesy of J. Wiss & Sons Co.

STRAIGHTENING AND FINISHING SCISSORS



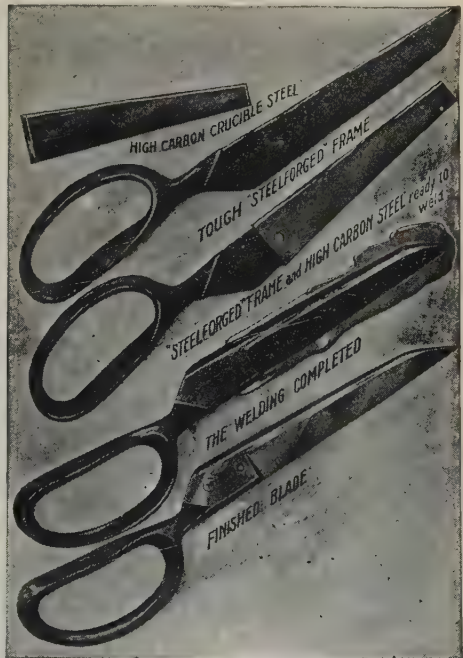
After the welding is done, our shears go through the same processes as one-piece scissors. This man is straightening a tempered blade by tapping it lightly with a hammer. This is called peening.



The blades are still rough, and they are now carefully ground until they are quite smooth and sharp, and ready for the polisher. They are then paired, and screwed together into pairs of shears, or scissors.



These shears, or scissors, are now polished as carefully as a knife, and nickel-plated, and, as a last step, are inspected by men who adjust the blades so that scissors will cut through cloth or paper.



This interesting picture shows clearly the steps taken in the making of a pair of shears. High carbon crucible steel is a very fine, hard steel, which is used to make tools that need a sharp edge.

THE ROMANS BUILD A HOUSE IN KENT



A Roman general directing the building of a governor's house by the Darent, where the foundations still lie beneath the grass.

The Book of All Countries

WHAT THIS STORY TELLS US

WE all like stories, and most of all true stories. We like to hear about our own and other countries as they are to-day and as they used to be. Our parents can tell us of yesterday, and our grandparents of the days before yesterday. When we want to go further back than that we can look in books. But even our books cannot tell us much of what happened two thousand years ago, for at that time nothing was written down, and so we have to guess a little from the things that have been found, like the bones of huge animals and rude tools and weapons. These we can see in our museums to-day and through them picture the big beasts and rough men who inhabited the land ages ago. This chapter, written by an Englishman, is about the very beginning of England. The writer starts in a period when England was not an island at all but joined to Europe, so that men and beasts were very similar.

ENGLAND IN THE LONG AGO

THERE are some stories of which we never tire, and among them are those that we like to hear when we sit round the hearth, and the dancing firelight plays on the faces of those who are our home-makers.

"Tell us again what grandfather did when he was young, or just one story more about what great-grandmother did when she was a little girl," is the eager cry. As the stories flow on—for father and mother love to tell as much as you love to hear—the life of the busy homeland of to-day, with the hum of its millions of workers, the clang and roar of its workshops and mills, all seem to be forgotten, as we step for a while into the quiet of the early part of last century.

You know the stories? How great-grandmother, in a large beaver bonnet and silk pelisse, went, when a child, to Ramsgate in a stage-coach; how she slept at Canterbury, because the journey which you now do in two hours took two days; how she and great-grandfather used to enjoy walking about the sweet green fields and woods, and resting in strawberry gardens near the Crystal Palace or Primrose Hill, where now you see nothing but rows of houses and shops; how great-grandfather took a whole week in a sailing boat in

CONTINUED FROM 1208



rough weather to travel from London home to Berwick.

If you have a great-grandmother who lived long ago near a large manufacturing town or port, such as Glasgow, Liverpool, Manchester,

she can tell you stories of how rivers were deepened and widened, and docks built; how villages grew quickly to be large towns; how quiet country lanes became one wide stretch of factories and cinder-heaps, crossed and crossed by railway lines. These stories are as wonderful as those of the magic of the genii who made palaces appear at will.

We are so accustomed to all the comforts and conveniences in the life of to-day, with our well-paved, well-kept and well-lighted streets, cheap and quick means of getting from place to place, and sending messages, that perhaps we take them all as a matter of course. But it is not so long ago that there were no telephones, no motor cars, no elevators, no telegrams, no electric lights, no bicycles, no railways, no penny post, no gas. As we listen to the stories of life without all these things, and how they all came to be, we realize how times change, and what a contrast there is between our wonderful world to-day and the yesterday which ushered it in.

And what about the times before

this yesterday? What happened in them? We can fancy the tide round our shores rising and falling day after day, year after year; the wind passing forever over the tree-tops, now gently, now roughly; the sun shining on and on, century after century, lighting up the waters of rivers and lakes and coloring the countrysides. But what about the people of the past? We know, in a way, that life has been going on in these British Isles for many years; most likely some great names belonging to them stand out for us. We realize, too, as we look about us or study pictures, that buildings such as Westminster Abbey, the great cathedrals, the Tower, and many now-ruined castles and churches scattered all over the country were the work of the men of bygone days.

We can piece together the story of these days which are beyond the memory of living men by looking carefully at the work and relics that have come down to us from them, and by reading in books and letters the descriptions of the times in which their writers lived. Often these writers have copied into their books extracts from the writings of others who lived and wrote long before themselves.

WHAT WAS HAPPENING IN OUR HOMELAND 2,000 YEARS AGO?

By these means we can follow a written history of this country of ours back and back for nearly two thousand years; and it is by this written history that we know what happened through the centuries which we mark A.D. These letters stand for Anno Domini, the year of the Lord; we count our years, as they pass, from the date of the birth of Christ, over 1900 years ago.

The years before His birth we mark B.C., before Christ. Now, if you ask how many centuries there were before Christ, this is what no one can tell you. The great earth-ball on which we live has been journeying around the sun—once round makes one year; a hundred times round makes one hundred years, or a century—for thousands of centuries. No one can say how many, for no one knows when the earth first started on the yearly journey, nor when men first appeared on its surface.

Perhaps you may think the twenty centuries which hold our country's written history a long enough time to

look across, filled as they are with stirring deeds and great changes. But if you wish to peer further back, and ask who were the very first men that lived in the country that is now ours, we must go back through ages of unknown length to seek them.

WHEN WILD MEN AND WILD ANIMALS WALKED FROM ENGLAND INTO FRANCE

Perhaps you have noticed how cliffs have been worn away by the sea, a few feet in a year, or you have heard of earthquakes in other parts of the world, raising or lowering whole districts; so you can understand that change is always going on in the shape of the land that rises above the sea. Now, the very oldest things found in this country are some roughly chipped stone tools, which dropped from the hands of the men who made and used them when this island home of ours was not an island, but was part of the continent now called Europe. Wild animals, as well as wild men, could therefore roam about as they pleased, with neither English Channel nor Irish Sea, as they are now called, to stop them. The white cliffs we see at Dover were joined to those at Calais, and the western parts of what are now the countries of France and Ireland showed an unbroken front to the great western ocean. You can judge of the size and strength of the wild animals that left their bones among us by visiting the Natural History Museum, where you can find those of the huge woolly mammoth elephants, of tigers—one of whom has left the mark of his sabre-tooth on the bones he gnawed—of bears, lions, reindeer.

THE FIRST TOOLS THAT THE FIRST WORKMEN USED

The poor, rough tools, shaped like a pear, found in the gravel beds or drift of old rivers, are ranged in numbers round the upper shelves in the Prehistoric Room in the British Museum. It is called prehistoric because the times to which they belong were before written history began. The owners of these tools looked out on a Thames stretching from the heights of Hampstead and Highgate to those of South London. What became of the Drift men, or the Cave men, who followed, we do not know. The Cave men's tools are better made and in greater variety; there are harpoons to catch fish, arrow-heads to shoot birds, and bone needles to sew skins together,

besides the sharp pear-shaped weapons for defense or for hunting.

The most interesting things the Cave men left behind are their drawings and carvings of the animals they saw before them; the great long-haired mammoth as he crashed along, the reindeer fighting, the oxen feeding, are all sketched from nature. Many specimens of these earliest drawings are found in the caves of England and France.

The earth-ball rolled steadily on through space year after year, century after century, and at last, as the ground sank in some places and rose in others, the sea rushed in over the lower levels and formed what is now called the North Sea, the English Channel and the Irish Sea, and Father Thames shrank to a mere shadow of his former great size. Soon men came again, crossing over the sea into the country that had now become an island; many different tribes followed each other, the new-comers pushing the others northward and westward, even across to Ireland and to Scotland.

NECKLACES THAT WERE WORN IN ENGLAND THOUSANDS OF YEARS AGO

As we look back to the far-off times of these settlers we find them very dark. They have left us no names, no writing. Perhaps the great stones set up at Stonehenge were used by them as a temple; perhaps they were set up about seventeen centuries before Christ. Seventeen centuries B.C. and twenty centuries A.D. makes thirty-seven centuries—3,700 years—ago!

The long and round grave-mounds, called barrows, still to be seen in many parts of the country are also believed to belong to the peoples of these times. In them are found skeletons and burnt bones, together with the rougher cups and vessels you can see in the museum below the Drift and Cave men's tools. They are headed "Contents of British Barrows." Sometimes a little child had a whole barrow to itself; sometimes many people are buried together. The ornaments, brooches and necklaces found in them will interest us; also the tools of bronze found often in spots where they are supposed to have been made. In these early metal factories lumps of copper and tin, of which the bronze is made, often lie side by side with old tools to be remelted and made into new ones. Then there are iron tools which came

into use as time went on and fresh people came to settle in various parts.

We get a few scattered beams of light on these times from the visits of some travelers, who came chiefly to look for the tin found in Cornwall and elsewhere.

THE GREAT LIGHT THAT BEGAN TO SHINE ON THESE TIMES

When they reached home they did what many travelers do to-day: they wrote books about what they had seen. These were copied into other books, and in this way we hear of the barns in which corn was stored, the rich, sweet drink that the natives offered them, and so on. A few centuries later, in the first century B.C., a great light suddenly lit up the country in which we have been groping. By its help we can now see plainly the people who lived in it. They were the children's children of the tribes who settled there from time to time. We call them Britons, and their country is called Britain. Now, whence came the light?

Let us take our map and find the Mediterranean Sea—the sea between the lands of Europe and Africa. The nations that lived on the shores of this great sea were very different from the Britons and other tribes living in the islands set in the wild Atlantic. They traded with each other; some were very learned; some produced the most beautiful temples and sculpture, as well as the bravest men, the world has ever seen. They all believed, however, that the part of the world on which they lived round the great sea was the whole of the world. They did not know that the earth is a ball, on which are the great continents of the Old World, as well as those of North and South America in the New. As we may read more fully in the Book of the Earth, they imagined the earth to be flat, with a great river running round it, and extraordinary were the tales they told of the wild and savage people who lived on the "edge."

THE GREAT ROMAN SOLDIERS WHO BROUGHT THE LIGHT TO ENGLAND

These tales they generally made up; but sometimes, as we have seen, travelers went to see for themselves. Their tales were often wonderful, too!

Now, in the century just before the birth of Christ, one of these Mediterranean nations had succeeded in conquering all the others, so that it was master

WHAT THE ROMANS LEFT BEHIND THEM



Small statue found in Lincolnshire.



A sculpture found near Bishopsgate.



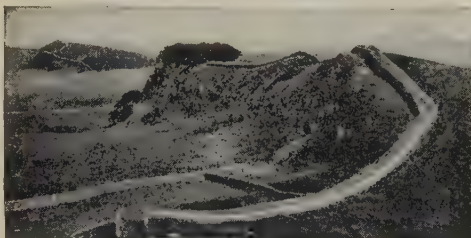
An altar, with inscriptions.



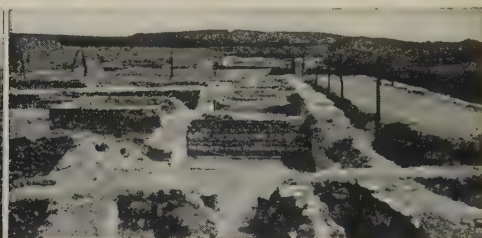
Iron sword and its plated scabbard.



Statue found in Suffolk.



The Roman wall across Britain.



Roman villa under a field at Darenth, in Kent.



A rare bronze tablet.



A stone tablet with figures.



A Roman spearman.



A beautiful vase.



Capital of a Roman column.



Figure of a warrior.

Photos Gibson & Sons, Penzance, Hexham, Youens & Frith.

VISIBLE FRAGMENTS OF ROMAN BRITAIN



An old stone figure.



Bronze jug found in Kent.



A gateway in the Roman wall.



A stone figure of a lady.



A tessellated pavement from London.



Sarcophagus found in London.



Arches of a Roman house in Northumberland.



The heating chamber in the Darenth Villa.



Foundations of an old Roman house.



The Roman Wall at Rochester.



A lion carved by a Roman sculptor.



A Roman bowl from Darenth.

of the whole of the then discovered world.

This was the Roman nation, and a great Roman soldier and ruler who stands out in this first century B.C. was the light-bearer.

As we study the calm, determined face of Julius Cæsar—his is the first bust in the gallery of Roman portraits in the British Museum—we shall find out by degrees what made him so strong and so powerful. He could make himself do what he believed to be best, as well as he could control others. He was always at work, conquering and settling his conquests, looking after his soldiers, and yet he found time to write books about his travels, which our schoolboys read now when they begin Latin. He gives many particulars about the Britons and their relations, the Gauls, whom he had just conquered. He did not conquer Britain; he visited it with his army two summers running, and described it to the civilized Roman world, who kept it in mind till a hundred years later. Then they were able to send enough soldiers to meet the warriors with faces stained blue to terrify their enemies, to disperse the chariots with scythes on their axles, to take the hill-camps fortified with stakes and logs of wood, and in time to subdue all the country of the plains.

WHEN BRITONS AND ROMANS LIVED SIDE BY SIDE

Little by little, as the soldiers, who had better arms and had been better trained, gained ground, many of the Britons were swept farther and farther west to the high moors of Cornwall, to the mountains of Wales and Cumberland. It is to these parts we turn, especially to Wales, to find the people whose forefathers were mainly ancient Britons, and to find echoes of the language spoken by them. It was here, too, that the old religion of the Britons, with the white-robed Druids, lasted longest. To-day, a survival of those times, we have the Bards.

Scattered all over the country, but chiefly in Wales, we find place-names that come from British words meaning a wood, a rock, a plain, an island, a waterfall, and many others more or less connected with the soil. Numbers of the Britons settled down, as time went on, among their Roman masters, from whom they learned many things. Some helped the soldiers to drain the marshes

and cut down trees, and to make the fine roads which crossed the country and are still a pleasure to use, so well and straight are they laid.

BOADICEA, QUEEN OF ENGLAND, AND THE BRAVE CHIEF CARACTACUS

Two great British names stand out in this first century A.D. Perhaps you know the statue of Boadicea, queen of one of the British tribes, which stands on the Embankment, by Westminster Bridge? She resisted the Romans, who had treated her very cruelly, with all her might, and our picture shows her well in her war car, urging on her soldiers to fight. Caractacus was another great British chief. He not only lost everything, in spite of his brave resistance, but was also taken prisoner to Rome with his wife and children. He did not behave at all as a frightened captive, but proudly, as a free-born king, said to the Roman emperor: "You fight to gain the whole world, and to make everybody your slaves. I fought to keep my own land, and for freedom."

For nearly four hundred years Britain was part of the Roman Empire. Great generals, like Agricola, came to push the conquests even farther; he built a line of forts between the Forth and the Clyde to keep out the wild mountaineers of the north. Are you thinking of that deep, wide valley as it is to-day, with coal and iron mines, factories and ports, fine farms and thousands of workers?

Emperors came and went; you can see their faces in the Roman Portrait Gallery in the British Museum, and may read their stories of where they stayed, and how they built walls to keep out the fierce Picts and Scots from Scotland and Ireland.

MEMORIES OF THE TIME WHEN THE ROMANS RULED ENGLAND

The remains of the wall between the Solway and the Tyne are still to be seen; a railway runs in that direction now, and the name is still before us when we speak of Wallsend coal, found at the end of the Roman "vallum." Other Roman names on our maps still show where the "castra," or camps, were raised to house the soldiers at Chester, Lancaster, Leicester. A "colony" was settled in Lincoln, and many places are called Street, from their position on or near the great "strata," or roads. Stratford is an example of this.

TWO BRAVE CHIEFS OF THE EARLY BRITONS



Boadicea was one of the first queens of the British people. She fought the Romans in the first century and led her people in battle, but she was defeated, and it is said that rather than be taken prisoner she slew herself. This statue of her stands at the foot of Westminster Bridge, facing the House of Parliament in London, and on it are the fine lines "Reigns Caesar never knew, Thy posterity shall away"; meaning that Boadicea's country should grow greater than Rome. This has come true, for Britain is now greater than Rome.



Caratacus was a great British chief living in the first century after Christ—about 1,800 years ago. He lost everything in fighting to drive out the Romans, and was taken prisoner to Rome with his wife and children. There he was brought before the Roman emperor, as shown above, but he was not afraid. "You fight to make everybody your slave," he told the emperor; "but I fight for freedom."

The thousands of soldiers who came during these centuries from every part of the empire—the British lads were sent just as far away—left many remains on the soil of the country in which they worked so hard. Many of these remains are now in the great museums of the country, especially in the cities founded by the Romans—in London, York, Colchester, Winchester and Bath. There are the altars they set up to their gods; their weapons and armor; the tablets to show long and faithful service, which gave them their discharge from the army; the memorial stones put up to honor their memories.

Many treasures of money and jewelry, perhaps buried in a hurry when danger arose, and never reclaimed, have been found among the foundations of cities, along the line of the walls, and on the sites of the beautiful country villas. These were built in the sunniest and healthiest positions, generally with a fine view, amidst gardens with fountains and statues.

LIFE IN THE CITY THAT LIES BENEATH LONDON

We can well picture the life in these villas, as we look at the fine pavements, the shoes of the ladies and children, the lamps, writing materials, mirrors and other treasures found buried among their ruins. Some of the pottery and glass were made in Britain, for the Britons were quick to learn, but most of the finest came through London.

London rose to be an important city in Roman times. Some twenty feet below the pavements of the city of to-day, so thronged with busy feet, we find the remains of its greatness. The strong walls built for its protection ran, to some extent, on the lines of the Underground Railway. Perhaps you have heard how many stations on it have the word "gate" in their names—Aldgate, Moorgate, and so on, and from these gates in the walls started the great roads which passed over the country—something like the great main lines of railways at the present time—to connect the city with their stations at Lincoln, York, Chester, Bath, Chichester and many others. Traders therefore found it a convenient spot to bring the goods they had for sale, especially as there was then, and for many years after, a short cut for their ships from the Channel by

the streams that made the Isle of Thanet really an island.

PIRATES FROM OVER THE SEA CAME TO ENGLAND IN BOATLOADS

Some time, perhaps, in the third century, Romans, as well as Britons, began to give up worshiping the gods of their fathers, and listened to the preaching of Christian missionaries; so there presently arose British churches and bishops. The country improved in many ways—more grain was grown, trade increased, and it seemed as if Roman law and order, and the liking for fine and comfortable lives, had all come to stay.

But this was not to be. In Britain itself troubles thickened as the Picts and Scots became more and more daring, and pirates from over the sea landed on the east and south coasts. Year by year, as the spring came round, fresh boatloads landed on the most desirable spots they could find, and took by force whatever they needed. In other parts of the great empire troubles thickened too, as fierce tribes poured over its distant borders and made their way toward the beautiful and wonderful capital itself. The only thing to be done, as the empire grew weaker and weaker, was to give up the most distant provinces and recall the soldiers who held them to defend those nearer its mighty heart. Finally came the turn of the garrisons in Britain.

THE ROMANS LOST THEIR POWER & LEFT THE BRITONS TO RULE THEMSELVES

So they had to leave the walls they had built, the cities and camps, with the theatres and baths, the castles—such as those at Richborough and Reculvers, which guarded the way to London when "Thanet was full isled." There must have been many a sad good-bye, for often Romans had British wives and relations, and the departure of those who had helped to make the country so prosperous must have sown despair in the hearts of those left behind to cope with the difficulties and dangers as best they might. They had so long been taken care of that they had quite forgotten how to make plans for themselves and fight altogether.

Listen to a letter they sent to Rome, asking for soldiers to come back and help them; it is so sad that it is called "the groans of the Britons." "The barbarians drive us to the sea; the sea drives us back to the barbarians. We

RULERS OF BRITAIN 1900 YEARS AGO



When the Romans were in power in Britain they brought all kinds of trade to the islands. Their soldiers were used to the products of many lands.



When Rome was threatened by invading barbarians she recalled her legionaries for protection. The Britons mourned the departure of their conquerors.



Long before the days of gunpowder, when the principal weapons of attack were swords, lances and bows and arrows, fortresses could rarely be taken. The Romans, having advanced as far as they could in northern Britain, built a great wall, and strengthened it at regular intervals with guard-houses (which you can see in the picture). It was a great engineering work similar in its thoroughness to their roads.

are either slain or drowned." Many sad relics of this time are found in the caves, where whole families were forced to take refuge when their homes were destroyed by the pirates. Thus it was that the light shed over Britain by the presence of the civilized Romans went out as the last boats carried away the last soldiers across the Channel back to Italy.

The wild Picts and Scots burst over the now undefended wall, and ruthlessly burned what they could not carry away back to the hills; the sea-rovers, who had been coming year after year to

these new-comers, for it is they who are the forefathers of our race. Tremendous changes have taken place, for so many generations have been born, have lived and died, during the fifteen centuries that have elapsed since they were living on the earth. But still, as a nation, we keep up a family likeness, and in many ways take after our great-great-grandfathers. Many of us are as fair-haired and blue-eyed as they were; we love the sea and adventure, though in a quieter way, quite as much as they did.

Half the words in our language, in-

THE RUINED HOUSE OF A ROMAN GOVERNOR, HIDDEN UNDER A PLOWED FIELD IN KENT



Under the surface lie remains of Roman England. We see in the museums parts of beautiful floors taken from the ruins of houses in which the Romans lived in England nearly 2,000 years ago. This picture shows the ruins of a Roman governor's house buried in a field on the banks of the river Darent, in Kent.

settle and stay, came ever thicker and faster.

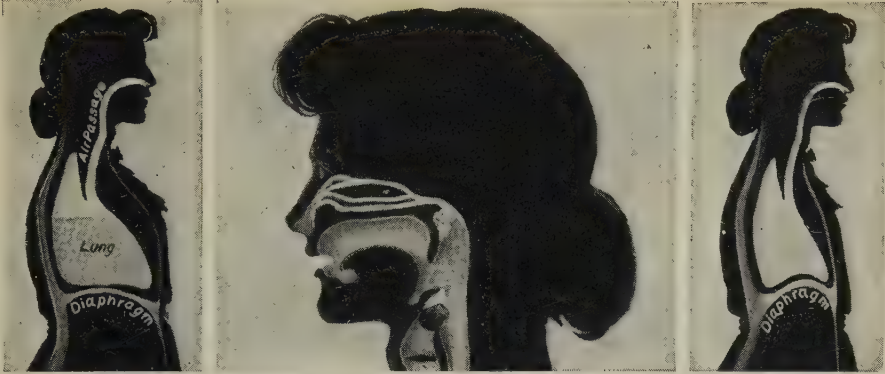
They burned the villas and towns, destroyed the camps, starved London to death because trade was stopped, and provisions could no longer come in by the land and water-gates from the roads and the river.

Once more Britons had to flee to the mountains in the west, and those who were left behind had to become the servants of the heathen new-comers, if they could not manage to stay on in their farms as owners.

We want to find out all we can about

cluding all the everyday words, have come from the language which the new-comers used when they first settled in this country, and in which they shouted directions to each other as they shipped their oars and grounded their boats on these shores.

Besides all this, and much more, the majority of our present laws, our ways of governing, our customs, have grown, through the centuries, from those they brought with them, together with the passionate love of freedom which we inherit from their old homes across the North Sea.



The middle diagram shows the air and food passages, with a lump of food lodged at the top of the windpipe. The side diagrams show how the diaphragm helps to fill and empty the lungs.

LIFE AND THE LUNGS

EVERY living thing must breathe, and now we come to study the lungs, the organs of breathing in ourselves and in all the higher animals. The real breathing, or burning, is done inside the living stuff called protoplasm, but the oxygen it needs is taken in by the lungs. These lie in the chest on a living floor of muscle which moves up and down as we breathe. The air enters the nose—or, when we breathe wrongly or in a hurry, by the mouth—and is there warmed, filtered and moistened.

Then it passes through the voice-box into the tubes that lead into the substance of the lungs. So it reaches the air-cells, as they are called, and there it comes near the blood which the heart has pumped to the lungs to meet it. We breathe by sucking in the air, and if we are wise we are careful never to wear any tight clothing over our breathing muscles, but to allow them free play in their ceaseless work of sucking into our lungs the air which our blood carries to every part of the body.

We have already learned that everything must breathe, and that one of the reasons why the blood circulates in us and in all the other animals that have blood, is to carry certain gases to and from the lungs. We have also

CONTINUED FROM 1213



learned that the real breathing is not in the lungs at all, but in the tissues of the body, where burning goes on. The scientific name for breathing is *respiration*, and real breathing is called *internal respiration*. We may say a word or two more about it before we consider the lungs and how they should be used.

It has been found that there is a great difference between ordinary burning and the way in which living matter breathes. In ordinary burning, the oxygen just comes to the outside of the coal, or whatever it is that burns, and is then combined with it; but living matter does not burn in this way. It takes the oxygen brought to it by the blood right into itself and probably does many wonderful things with it, producing all the time the changes which are life, before at last it gives out the oxygen combined with carbon to form carbon dioxide, and combined with hydrogen to form water. Thus we say that the breathing of living matter, or protoplasm, is inside its molecule, and as the word *intra* is Latin for "within," the proper way of stating this is to say that the breathing of protoplasm is *intra-molecular*, or inside the molecules. It does not matter if you forget the scientific term so long as you remember the fact.

We have seen that the heart lies in

the middle of the chest and has one lung on each side of it. We must now learn what makes the floor of the chest, for this is a living floor, and the lungs cannot be used without its help.

It is a flat sheet of muscle stretched across the middle of the body. There are a few openings in it, but otherwise it is a complete partition between the upper and lower halves of the trunk. It has a rather curious name, which, however, is used for many other purposes; it is *diaphragm*, pronounced *dī-a-fram*, and it is used for anything *stretched across*.

This diaphragm in our bodies has been described as flat, but really it is dome-shaped. It is a living floor, for it is a muscle. When it contracts it becomes more nearly flat, for it presses downward. This, of course, means that everything beneath it is pressed upon, and as this muscle acts every time we breathe properly, you will notice that when you take a long breath the lower part of your body bulges forward. That is because the floor of the chest, which is also the roof of the lower part of the body, has moved downward and become flatter, so that the lower part of the trunk, the abdomen, is forced to bulge forward.

THE CHANNEL THROUGH WHICH THE AIR ENTERS INTO OUR BODIES

Upon this diaphragm, then, there rest the heart and the two lungs. The part of each lung that rests upon it is called its base; it is the widest and broadest part of the lung. If we look at the base of each lung and then follow it upward, we shall see that it becomes narrower and smaller, until at last it ends almost in a point which actually comes up near the neck behind the collar-bone. It is important to remember that the greatest bulk of the lung is its lowest part, for there are two ways of breathing—one which fills the upper part of the lung with air and one which fills the lower part; and we see, of course, that it must be better to breathe in the way which fills the biggest and roomiest part of the lung. Now let us begin at the very beginning of the act of breathing and see where the air goes.

There is a perfectly definite channel for the air from the outside world to the lungs, and if we are wise, we always breathe by this channel. The opening of it is the nose. Now, this is very important, for it happens that we, unlike some animals, can also breathe through

our mouths, and though there is no objection to doing this sometimes, we should know that the mouth is the opening of the canal that has to do with food, while the nose is the opening of the canal that has to do with air. Each opening is provided with suitable arrangements for its special purpose. The mouth has teeth and all the arrangements for tasting; the nose has little hairs for filtering the air, and it contains all the arrangements for smelling, as well as a wonderful lining, or membrane, which can be flooded with blood so as to warm the air before it enters our lungs.

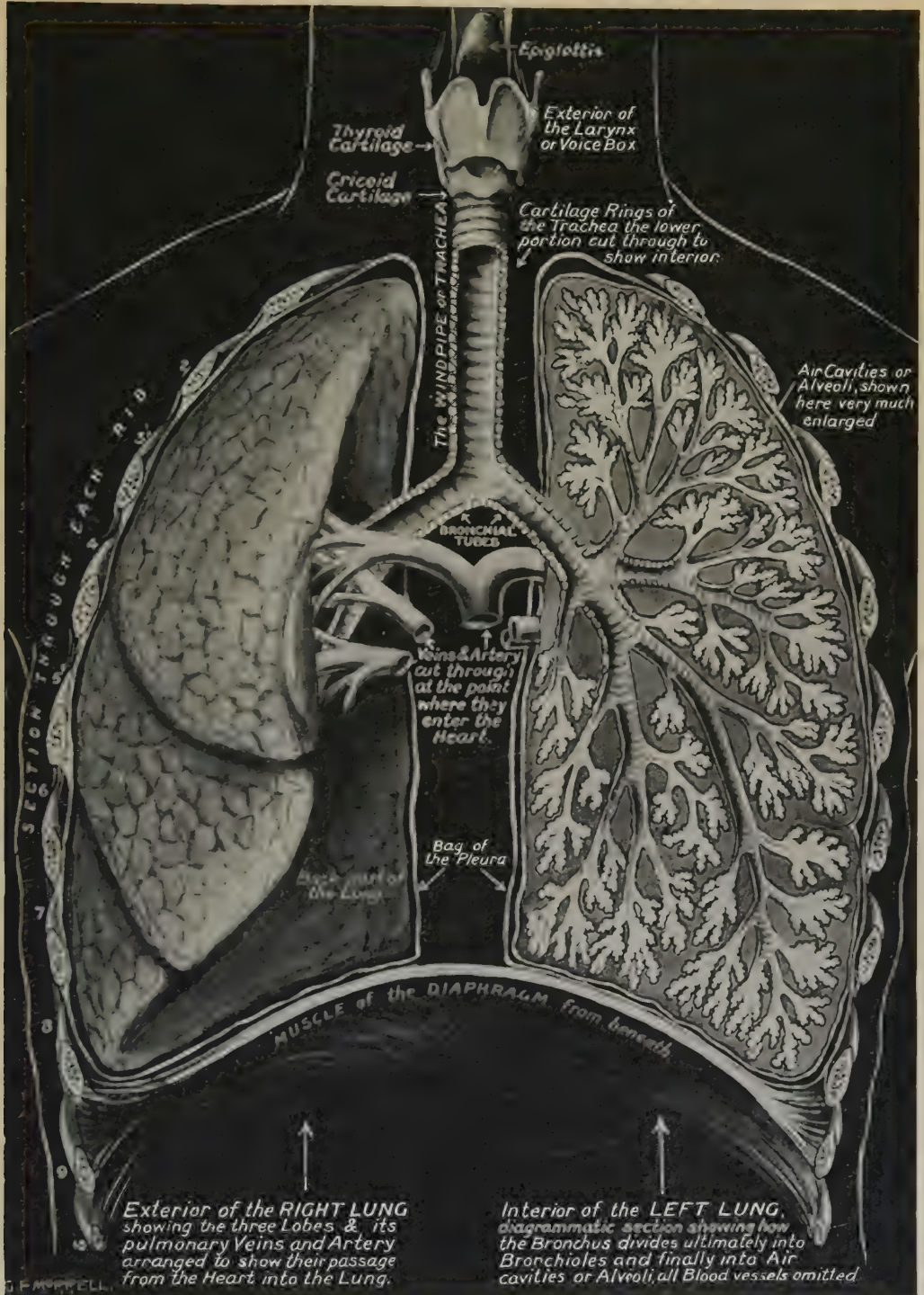
THE WAY THE AIR IS FILTERED AS IT COMES INTO OUR LUNGS

But this is not all. If we trace out the passage of the air through the nose, we find that, instead of being straight and open, it is extraordinarily twisted and roundabout. This is a great advantage. For one thing, it compels the air to pass over a great surface which has warm blood underneath it, so that the air is warmed; and it means, also, that a good deal of water-vapor—water in the form of gas—can be added to the air if it does not already contain enough. That is good, for perfectly dry air is very irritating to our lungs and dries them up in a very unhealthy way. Lastly, this long, twisted, in-and-out passage for the air makes a splendid filter. A large quantity of all the dirt in the air and of any microbes that may be in it, is stopped by this filter, so that the air which is allowed to pass on to the lungs is not only warmed and moistened, but is greatly purified. Experiments have been made which show that when, by means of a tube passed into the mouth, we withdraw the air which has been through the nose filter and is on its way to the lungs, few microbes can be found in it, though it may have had hosts in it when it entered the nose. It follows, then, that it is the duty of everyone to breathe through the nose.

A MOST IMPORTANT THING IN LIFE IS TO BREATHE THROUGH THE NOSE

Now, the passage of air is easier through the mouth than through the nose, just because the mouth does not trouble to filter it; so that, if you keep your mouth open, air is sure to enter through it when you breathe. The rule, then, must be to keep the mouth shut. It should be opened when we have something to swallow or something to say.

HERE COMES EVERY BREATH YOU BREATHE



THE LUNGS, SHOWN AS THEY ARE AND ALSO IN SECTION

In this picture-diagram the front wall of the chest has been removed, so that the two lungs and their connections are seen. The windpipe is shown dividing into the two bronchial tubes, and a section through the left lung reveals the left bronchial tube dividing and finally ending in the air-cells. The right lung, which is not shown in section, is seen to be divided into three parts, or lobes. The diaphragm is also represented.

There are few more important lessons for health than this lesson of breathing through the nose. Every child should be taught it, and the way to learn it is to learn to keep the mouth shut. All over the land there are unfortunate children whom their teachers think stupid, who are not as tall and heavy as they should be for their age, who suffer from frequent colds and sore throats, and so on, simply because they have something the matter with their noses which prevents them from breathing properly.

WHAT IT IS THAT HAPPENS WHEN WE HAVE A CHOKING FIT

After passing through the nose-filter, the air streams into the throat at the back of the mouth and passes into the voice-box, the front of which you can feel in your neck. This voice-box has two folds of tissue stretched across it from each side, with a tiny chink between them. Every time we breathe in air, the brain sends an order through certain nerves to the muscles which govern these little vocal cords, and they swing wide apart, so as to leave a large space through which the air can pass without making any sound.

We all know what a choking fit is. What happens then is that something or other which has got into the voice-box has thrown this beautiful arrangement out of order, and the vocal cords, instead of separating to let us breathe, are thrown together so that the air can scarcely force its way between them. In doing this it sets them trembling, or vibrating, and so makes little noises.

But though we feel very miserable during a choking fit, we need not be afraid, for as soon as the brain finds it is getting too little oxygen in the blood brought to it, it *always* orders the vocal cords to relax, and in a moment we find that we can take a long, deep breath quite easily. Of course, this cannot save us in rare cases where a lump of food or something is actually stuck in the top of the voice-box so that the air cannot get past it. This is the only serious kind of choking.

HOW WE MAY SAVE OURSELVES IN A CHOKING FIT

If we have all learned at school the simple things which really matter, no one need ever be killed in this way, so long as anyone else is present. Indeed, one could save oneself. The top of the voice-box

is so near to the mouth, after all, that anyone can be saved by a forefinger quickly and boldly passed into the mouth so as to remove the obstacle. This needs nothing more than courage.

Of course, little specks of food often find their way into the voice-box, but the result of that is to make us cough violently, which brings up a blast of air from the lungs that blows the obstacle away.

It is a curious thing about the body that, of the two passages in the throat, one for the air and one for the food, the food-passage lies behind. This means that everything we swallow has to be made to jump across the opening through the voice-box into the lungs. We find this very easy because the act of swallowing is such a wonderful one, though most of us think little about it. It depends upon the beautifully balanced use of scores of nerves and muscles. If we laugh or try to talk just when we are swallowing, we throw this beautiful machinery out of order, and instead of everything's passing safely over the opening that leads to the lungs, some of it may get into the wrong passage.

THE TWO TUBES THROUGH WHICH OUR BREATH GOES TO THE LUNGS

After passing through the voice-box the air flows down the windpipe. This is a large round tube which you can feel in your neck. Just below the big part of the voice-box is a sort of ring, easily felt, which is really part of the voice-box itself. Below that you can feel the round tube running down into the chest. If you feel carefully with the tip of your finger you will find that this round tube is made of a number of little rings. This we usually call the windpipe. Its special name does not matter. After it has passed down some distance it divides into two tubes, one going to the right lung and the other to the left. Each of these in the substance of the lungs divides up again and again like a tree. These tubes are called the *bronchi*, a name which we can all remember, as when the tubes fall ill we call the trouble bronchitis. As they subdivide, the branches get smaller and smaller, until at last they become quite tiny. Then we find that they end in a number of little buds, as we might call them, known as the air-cells.

These are not what we have learned to understand by the word cells, but little

hollow spaces with very fine walls lined with living cells and containing air. With the first breath a baby draws the lungs become filled with air which has certain duties to perform in the air-cells as it passes through. The air-cells are exceedingly thin, and underneath them runs a number of tubes containing blood which has to be purified. This means that the gases have to pass through two layers of cells—the layer which lines the air-cell and the layer which forms the wall of the tube. The oxygen gas passes into the blood to purify it, while the unwholesome material of the blood finds its way into the air-cell, to be breathed out and got rid of.

THE LUNG AND ITS TWO THOUSAND SQUARE FEET OF SURFACE

The structure of the lung is beautifully adapted for its purpose. Men have tried to measure the extent of surface where the blood is exposed to the air in the lungs, and they say that, in consequence of the way in which the lung is made, this surface would actually measure, if it were stretched out, two thousand square feet. If the lung were simply a big hollow space, it would have only two or three square feet of surface. As it is made rather like a sponge, the surface of it is increased to this enormous extent, so that there is space enough for the blood to be purified.

If we could see the lung of a newborn baby, we should find it pearly white, but tinted with pink by the blood; if there were no blood in it, it would be perfectly white. The lung of an Eskimo, if he has never breathed coal-dust and smuts, is the same color as that of a newborn baby; the lung of a coal-miner is quite black, owing to the large quantity of black coal-dust he breathes. The miner's nose cannot keep out everything, and all the particles it fails to keep back, which get into the lung, stay there, except that a few of them are picked up by the white blood-cells and may be got rid of by coughing. The lung of an ordinary city-dweller is slate gray—about half as dirty as the coal-miner's.

THE LIVING OARS OF THE LUNGS THAT DRIVE THE DUST BACK

It is one of the most important duties of the lung to keep itself free, as far as possible, from any foreign matter; the air-passages must be kept clear and open and without obstruction. There is a beautiful arrangement that helps this.

If we look through the microscope at the cells which line the windpipe and the bronchial tubes almost down to where they end in the air-cells, we find that they are lined with cells of a particular kind. These have a number of tiny things sticking out from them, rather like eyelashes, so that they are called after the Latin word for eyelashes, which is *cilia*.

All these living oars, or cilia, lash in the same direction, *upward*. They do their best, then, to push upward the dust and dirt we breathe, and then, when we cough, we get rid of these. But the lung of the coal-miner and the lung of the city-dweller prove that, in spite of the nose-filter, and the white cells and the power to cough, and the cilia of the cells that line the windpipe and bronchial tubes, it is still impossible for the lung to keep itself clean if, day after day, we breathe the dirt with which the air of cities is filled.

A great feature of the tissue of the lung is that it is elastic. This is due to the fact that it contains a great quantity of the special kind of tissue which we find in the body wherever elasticity is wanted. This tissue looks yellow under the microscope, and is made up of tiny threads which can be seen to curl up if they are loosened out. The lung is rich in this elastic tissue, and this is most important, since it has a great deal to do with breathing. The act of breathing out costs us in health no trouble at all, for it very largely depends on the elastic recoil of the stretched lung itself.

WHY WE SHOULD WEAR OUR CLOTHES LOOSE AND NOT TIGHT

A grown-up man breathes about fifteen or sixteen times in a minute; a woman perhaps eighteen. Children breathe much more often. Breathing has two parts—breathing air in and breathing air out. The first is called *inspiration* and the second *expiration*, and we must learn how these acts are performed.

The muscles of breathing are very numerous; indeed, in what is called forced breathing almost every muscle of the trunk is used, but in ordinary breathing we use simply the diaphragm and the thin muscles between the ribs. Much the most important is the diaphragm, and it is important to give the diaphragm free play in breathing. If we wear tight clothes round the waist, the diaphragm is interfered with, and we can breathe only by using the ribs.

When we breathe, an order is sent to the diaphragm from the brain, and it becomes flattened. This acts like what is called a suction pump. The amount of room in the chest is increased, and the air from the outside is sucked in.

At the same moment the brain, which governs the whole process, sends an order down to the voice-box, so that a wide opening is made there between the vocal cords for the air to pass through. Inspiration, then, is a muscular act requiring effort, and the muscles which perform it must go on acting if we are to live. A person may lie in bed all his life and may never even move himself. The muscles of his neck and arms and legs and trunk may lie still for years, but there are at least two muscles which must be in action if he is to go on living; they are the heart and the diaphragm.

Expiration, or breathing out, is quite different. Except when we cough or sneeze, or speak or sing, or when there is some obstruction in the air-passages, expiration costs no effort at all, and no muscles are used. What happens is simply elastic recoil—the recoil of the stretched lung and of the wall of the abdomen, which, as we know, bulges forward when we breathe.

THE SMALL SPOT IN THE BRAIN WHICH IS THE CENTRE OF OUR LIFE

The whole of this wonderful process is entirely governed by a small spot in the brain which we call the breathing-centre. It lies quite near the centres that govern the heart and blood-vessels. The old name given to this centre when it was first found was the *vital point*, because, in a sense, it is the centre of our life. If anything destroys it, we must die.

We know now how this wonderful centre works and how it can modify our breathing. The nerve-cells that make it up are nourished by the blood, and they are very sensitive to the quality of the blood that reaches them. Especially are they sensitive to the presence of too much carbon dioxid in the blood. Nothing else excites them so much. Directly this happens, they send powerful orders to the breathing muscles to breathe deeply and quickly, and get rid of the excess of this poison.

Now, as these nerve-cells act entirely in accord with the quality of the blood, there is a way of getting them to rest for a time, and this is known by everyone who performs diving feats. Boys often try to

see how many plates they can pick off the floor of a swimming bath. Now, the way to stay under water as long as possible is to take a number of quick, long, deep breaths for a little while before you dive in. By this means you get rid of a great deal of the carbon dioxid in your blood, and you can stay under water a long time.

HOW THE NEW AIR TAKES THE PLACE OF THE OLD IN OUR LUNGS

We are likely, perhaps, to think that the air we breathe passes right to our lungs, but, in fact, the amount of air we breathe in an ordinary breath is hardly enough to fill the air-passage from the nose to the bottom of the windpipe. Even though the nose warms and moistens the air, it does not do so nearly enough to make the air fit to go right into the depth of the lungs. It is thus really only the top layer of the air in our lungs that we change every time we breathe and the rest is done by what is called *diffusion*.

We give off much more carbon dioxid than usual when we take exercise, and also for some time after a meal; especially if there has been a good deal of sugar and fat in the food, for these things are quickly burned, producing carbon dioxid. We all breathe less at night, and older people breathe less than younger people. We also breathe more vigorously and more deeply in the presence of light—a most important fact which should never be forgotten. We breathe more vigorously in cold weather, as we naturally require more heat in order to keep up the warmth of the blood, and breathing supplies oxygen for the fuel of the body.

It is very interesting to observe the vigor of breathing in different creatures. The small song-birds are the most vigorous breathers of all. This is not surprising if we think of the enormous amount of work a bird does when both flying and singing.

THE CEASELESS SUPPLY OF OXYGEN THAT MEANS LIFE TO US

The possibility of breathing depends on the fact that there is more oxygen in the air outside than in the blood, and that there is less carbon dioxid in the air outside than in the blood. The interchange of the gases is possible only because this is so. It is possible to measure exactly the amount of carbon dioxid in the air, and to say at what point that amount becomes too high for safety. If

we attempt to breathe air containing too much carbon dioxid, the carbon dioxid in our blood cannot get out quickly enough, and we must die.

There is a cave in Italy called the Cave of Dogs, where the air contains a great deal of carbon dioxid. Owing to the fact that carbon dioxid is heavier

should be allowed for each person, but these rules are not nearly enough. It is no good having many cubic feet of space for each person if the air in that space is, not regularly changed.

We know that if a single person were put to sleep in the largest bedroom in the house, and the air were not changed, it



SICK BABIES GROW STRONG WHEN KEPT IN THE OPEN AIR



SUN AND FRESH AIR HELP TO CURE TUBERCULOSIS

than air, it lies in a layer on the floor, with the result that a man going into the cave can breathe there because his mouth is above the level of the carbon dioxid, while a dog will fall down unconscious because its nose is below the surface of the carbon dioxid, and so it cannot breathe.

Some day the law of the land will lay down definite rules as to the quality of the air in shops and workshops and factories, and so on. Already there are rules as to the number of feet of space that

would be unfit to breathe long before the morning. That is why it is our duty to keep our bedroom windows open. Grace Darling died of consumption, though during the day she breathed the splendid sea air, because at night she slept in a tiny room with a closed window.

Everyone should sleep in a bedroom with a window open. Rooms that have no windows, or windows that will not open, are not fit to sleep in.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 1415.

THE TRIAL OF THE KNAVE OF HEARTS



The King and Queen of Hearts were seated on their throne, with a great crowd assembled about them. In the very middle of the court was a table, with a large dish of tarts upon it. The first witness was the Hatter. He came in with a teacup in one hand and a piece of bread and butter in the other. "I beg pardon, your Majesty," he began, "for bringing these in; but I hadn't quite finished my tea when I was sent for." The Queen put on her spectacles and began staring hard at the Hatter, who turned pale and fidgeted. "Give your evidence," said the King; "and don't be nervous, or I'll have you executed on the spot."

ALICE'S ADVENTURES IN WONDERLAND

WE left Alice just after she got up and walked away from the Mad Tea-party. It will be remembered that the behavior of the Hatter was altogether so rude that after she had tolerated his conduct for quite a long time she felt that she had to show him and the March Hare what she thought of them, by rising up and taking an abrupt leave of the party. As she went away they were trying to put the Dormouse in the teapot! Making her way through the wood, she vowed never to go there again. Her purpose was now to get into the beautiful garden, and this at last she managed to do. The adventures that befell her there are told in the following pages.

ALICE AND THE QUEEN OF HEARTS

WITH THE MOCK TURTLE'S STORY AND THE LOBSTER QUADRILLE

ALICE got into the beautiful garden at last, but she had to nibble a bit of the mushroom again to bring herself down to twelve inches after she had got the golden key, so as to get through the little door. It was a lovely garden, and in it was the Queen's croquet-ground. The Queen of Hearts was very fond of ordering heads to be cut off. "Off with his head!" was her favorite phrase whenever anybody displeased her. She asked Alice to play croquet with her, but they had no rules; they had live flamingoes for mallets, and the soldiers had to stand on their hands and feet to form the hoops. It was extremely awkward, especially as the balls were hedgehogs, who sometimes rolled away without being hit. The Queen had a great quarrel with the Duchess, and wanted to take her head off. Alice found the state of affairs in the lovely garden not all so beautiful as she had expected. But after the game of croquet, the Queen said to Alice:

"Have you seen the Mock Turtle yet?"

"No," said Alice. "I don't even know what a mock turtle is."

"It's the thing mock turtle soup is made from," said the Queen.

"I never saw one or heard of one," said Alice.

"Come on, then," said the Queen, "and he shall tell you his history."

As they walked off together, Alice heard the King say in a low voice to



the company generally: "You are all pardoned."

"Come, *that's* a good thing!" she said to herself, for she had felt quite unhappy at the number of executions the Queen had ordered.

They very soon came upon a gryphon, lying fast asleep in the sun.

"Up, lazy thing!" said the Queen; "and take this young lady to see the Mock Turtle, and to hear his history. I must go back and see after some executions I have ordered." And she walked off, leaving Alice alone with the Gryphon.

Alice did not quite like the look of the creature, but, on the whole, she thought it would be quite as safe to stay with it as to go after that savage Queen; so she waited.

The Gryphon sat up and rubbed its eyes; then it watched the Queen till she was out of sight, then it chuckled. "What fun!" said the Gryphon, half to itself, half to Alice.

"What *is* the fun?" said Alice.

"Why, *she*," said the Gryphon. "It's all her fancy, that; they never executes nobody, you know. Come on!"

"Everybody says 'Come on' here," thought Alice, as she went slowly after it. "I never was so ordered about before in all my life, never!"

They had not gone far before they saw the Mock Turtle in the distance, sitting sad and lonely on a little ledge of rock, and as they came nearer, Alice could hear him sighing as if his heart would break. She pitied him deeply.

"What is his sorrow?" she asked the Gryphon, and the Gryphon answered, very nearly in the same words as before:

"It's all his fancy, that. He hasn't got no sorrow, you know. Come on!"

So they went up to the Mock Turtle, who looked at them with large eyes full of tears, but said nothing.

"This here young lady," said the Gryphon, "she wants for to know your history, she do."

"I'll tell it her," said the Mock Turtle in a deep, hollow tone. "Sit down, both of you, and don't speak a word till I've finished."

So they sat down, and nobody spoke for some minutes. Alice thought to herself: "I don't see how he can *ever* finish if he doesn't begin." But she waited patiently.

"Once," said the Mock Turtle at last, with a deep sigh, "I was a real turtle."

These words were followed by a very long silence, broken only by an occasional exclamation of "Hjckrrh!" from the Gryphon, and the constant, heavy sobbing of the Mock Turtle. Alice

was very nearly getting up and saying: "Thank you, sir, for your interesting story," but she could not help thinking there *must* be more to come, so she sat still and said nothing.

"When we were little," the Mock Turtle went on at last, more calmly, though still sobbing a little now and then, "we went to school in the sea. The master was an old turtle—we used to call him Tortoise—"

"Why did you call him Tortoise if he wasn't one?" Alice asked.

"We called him Tortoise because he taught us," said the Mock Turtle angrily. "Really, you are very dull!"

"You ought to be ashamed of yourself for asking such a simple question," added



"Off with his head!" was the favorite phrase of the Queen of Hearts whenever anybody displeased her. She asked Alice to play croquet; but they followed no rules; they had live flamingoes for mallets, and the balls were living hedgehogs rolled up, who sometimes moved away without being hit.

the Gryphon; and then they both sat silent and looked at poor Alice, who felt ready to sink into the earth. At last the Gryphon said to the Mock Turtle:

"Drive on, old fellow! Don't be all day about it!" And he went on in these words:

"Yes, we went to school in the sea, though you mayn't believe it—"

"I never said I didn't!" interrupted Alice.

"You did!" said the Mock Turtle.

"Hold your tongue!" added the Gryphon, before Alice could speak again. The Mock Turtle went on:

"We had the best of educations—in fact, we went to school every day—"

"I've been to a day-school, too," said

Alice. "You needn't be so proud as all that."

"With extras?" asked the Mock Turtle a little anxiously.

"Yes," said Alice; "we learned French and music."

"And washing?" said the Mock Turtle.

"Certainly not!" said Alice indignantly.

"Ah, then yours wasn't a really good school!" said the Mock Turtle, in a tone of great relief. "Now, at *ours* they had at the end of the bill, 'French, music, and washing—extra,'"

"You couldn't have wanted it much, living at the bottom of the sea."

"I couldn't afford to learn it," said the Mock Turtle, with a sigh. "I only took the regular course."

"What was that?" inquired Alice.

"Reeling and Writhing, of course, to begin with," the Mock Turtle replied; "and then the different branches of Arithmetic—Ambition, Distraction, Uglification, and Derision."

"I never heard of 'Uglification,'" Alice ventured to say. "What is it?"

The Gryphon lifted up both its paws in surprise, and stared at Alice.

"Never heard of uglifying!" it exclaimed. "You know what to beautify is, I suppose?"

"Yes," said Alice doubtfully; "it means—to make—anything—prettier."

"Well, then," the Gryphon went on, "if you don't know what to uglify is, you are a simpleton."

Alice did not feel encouraged to ask any more questions about it, so she turned to the Mock Turtle, and said: "What else had you to learn?"

"Well, there was Mystery," the Mock Turtle replied, counting off the subjects on his flappers—"Mystery, ancient and modern, with Seaography; then Drawling—the Drawling-master was an old conger-eel, that used to come once a week; *he* taught us Drawling, Stretching, and Fainting in Coils."

"What was *that* like?" said Alice.

"Well, I can't show it you myself," the Mock Turtle said; "I'm too stiff. And the Gryphon never learned it."

"Hadh't time," said the Gryphon. "I went to the Classical master, though. He was an old crab, *he* was."

"I never went to him," the Mock Turtle

THE MOCK TURTLE TELLS HIS STORY TO ALICE AND THE GRYPHON



"Once," said the Mock Turtle, with a deep sigh, "I was a real turtle." These words were followed by a long silence, broken only by an occasional exclamation of "Hjckrrh!" from the Gryphon, and the constant sobbing of the Turtle. Alice was very nearly getting up and saying: "Thank you, sir, for your interesting story," but she could not help thinking there must be more to come, so she sat still and said nothing.

said, with a sigh. "He taught Laughing and Grief, they used to say."

"So he did, so he did," said the Gryphon, sighing in its turn. And both creatures hid their faces in their paws.

"And how many hours a day did you do lessons?" said Alice, in a hurry to change the subject.

"Ten hours the first day," said the Mock Turtle; "nine the next, and so on."

"What a curious plan!" exclaimed Alice.

"That's the reason they're called lessons," the Gryphon remarked; "because they lessen from day to day."

This was quite a new idea to Alice, and she thought it over a little before she made her next remark.

"Then the eleventh day must have been a holiday?"

"Of course it was," said the Mock Turtle.

"And how did you manage on the twelfth?" Alice went on eagerly.

"That's enough about lessons," the Gryphon interrupted, in a very decided tone. "Tell her something about the games now."

The Mock Turtle sighed deeply, and drew the back of one flapper across his eyes. He looked at Alice, and tried to speak; but for a minute or two sobs choked his voice.

"Same as if he had a bone in his throat," said the Gryphon, and it set to work shaking him and punching him in the back.

At last the Mock Turtle recovered his voice, and, with tears running down his cheeks, he went on again:

"You may not have lived much under the sea"—"I haven't," said Alice—"and perhaps you were never even introduced to a lobster" (Alice began to say, "I once tasted—" but checked herself, and said, "No, never") "so you can have no idea what a delightful thing a Lobster Quadrille is!"

"No, indeed," said Alice. "What sort of a dance is it?"

"Why," said the Gryphon, "you first form into a line along the seashore—"

"Two lines!" cried the Mock Turtle. "Seals, turtles, salmon, and so on. Then when you've cleared all the jelly-fish out of the way—"

"That generally takes some time," interrupted the Gryphon.

"You advance twice—"

"Each with a lobster as a partner!" cried the Gryphon.

"Of course," the Mock Turtle said.

"Advance twice, set to partners—"

"Change lobsters, and retire in same order," continued the Gryphon.

"Then, you know," the Mock Turtle went on, "you throw the—"

"The lobsters!" shouted the Gryphon, with a bound into the air.

"As far out to sea as you can—"

"Swim after them!" screamed the Gryphon.

"Turn a somersault in the sea!" cried the Mock Turtle, capering wildly about.

"Change lobsters again!" yelled the Gryphon, at the top of its voice.

"Back to land again, and—that's all the first figure," said the Mock Turtle, suddenly dropping his voice. And the two creatures, who had been jumping about like mad things all this time, sat down again very sadly and quietly, and looked at Alice.

"It must be a very pretty dance," said Alice timidly.

"Would you like to see a little of it?" said the Mock Turtle.

"Very much indeed," said Alice.

"Come, let's try the first figure," said the Mock Turtle to the Gryphon. "We can do without lobsters, you know. Which shall sing?"

"Oh, *you* sing!" said the Gryphon. "I've forgotten the words."

So they began solemnly dancing round and round Alice, every now and then treading on her toes when they passed too close, and waving their fore-paws to mark the time; while the Mock Turtle sang this, very slowly and sadly:

"Will you walk a little faster?" said a whiting to a snail,

"There's a porpoise close behind us, and he's treading on my tail.

See how eagerly the lobsters and the turtles all advance!

They are waiting on the shingle—will you come and join the dance?

Will you, won't you, will you, won't you, will you join the dance?

Will you, won't you, will you, won't you, won't you join the dance?

"You can really have no notion how delightful it will be

When they take us up and throw us, with the lobsters, out to sea!"

But the snail replied "Too far, too far!" and gave a look askance—

Said he thanked the whiting kindly, but he would not join the dance.



"Come, let's try the first figure," said the Mock Turtle to the Gryphon. "We can do without lobsters, you know." So they began dancing round Alice, every now and then treading on her toes when they passed too close, and waving their fore-paws to mark the time; while the Mock Turtle sang very slowly and sadly.

Would not, could not, would not, could not,
would not join the dance.
Would not, could not, would not, could not,
could not join the dance.

"What matters it how far we go?" his scaly friend replied,

"There is another shore, you know, upon the other side.

The further off from England the nearer is to France—

Then turn not pale, beloved snail, but come and join the dance.

Will you, won't you, will you, won't you,
will you join the dance?

Will you, won't you, will you, won't you,
won't you join the dance?"

"Thank you; it's a very interesting dance to watch," said Alice, feeling very glad that it was over at last. "And I do like that curious song about the whiting."

"Oh, as to the whiting," said the Mock Turtle, "they— You've seen them, of course?"

"Yes," said Alice; "I've often seen them at dinn—"

She checked herself hastily.

"I don't know where Dinn may be,"

said the Mock Turtle; "but if you've seen them so often, of course you know what they're like."

"I believe so," Alice replied thoughtfully. "They have their tails in their mouths, and they're all over crumbs."

"You're wrong about the crumbs," said the Mock Turtle. "Crumbs would all wash off in the sea. But they *have* their tails in their mouths; and the reason is—" Here the Mock Turtle yawned and shut his eyes. "Tell her about the reason, and all that," he said to the Gryphon.

"The reason is," said the Gryphon, "that they *would* go with the lobsters to the dance. So they got thrown out to sea. So they had to fall a long way. So they got their tails fast in their mouths. So they couldn't get them out again. That's all."

"Thank you," said Alice, "it's very interesting. I never knew so much about a whiting before."

"I can tell you more than that, if you like," said the Gryphon. "Do you know why it's called a whiting?"

"I never thought about it," said Alice. "Why?"

"*It does the boots and shoes,*" the Gryphon replied very solemnly.

Alice was thoroughly puzzled. "Does the boots and shoes!" she repeated in a wondering tone.

"Why, what are *your* shoes done with?" said the Gryphon. "I mean, what makes them so shiny?"

Alice looked down at them, and considered a little before she gave her answer. "They're done with blacking I believe."

"Boots and shoes under the sea," the Gryphon went on in a deep voice, "are done with whiting. Now you know."

"And what are they made of?" Alice asked, in a tone of great curiosity.

"Soles and eels, of course," the Gryphon replied rather impatiently. "Any shrimp would have told you that."

"If I'd been the whiting," said Alice, whose thoughts were still running on the song, "I'd have said to the porpoise: 'Keep back, please; we don't want *you* with us.'"

"They were obliged to have him with them," the Mock Turtle said. "No wise fish would go anywhere without a porpoise."

"Wouldn't it, really?" said Alice, in a tone of great surprise.

"Of course not!" said the Mock Turtle. "Why, if a fish came to *me*, and told me he was going on a journey, I should say: 'With what porpoise?'"

"Don't you mean 'purpose'?" said Alice.

"I mean what I say," the Mock Turtle replied in an offended tone. And the Gryphon added: "Come, let's hear some of *your* adventures."

"I could tell you my adventures, beginning from this morning," said Alice a little timidly; "but it's no use going back to yesterday, because I was a different person then."

"Explain all that," said the Mock Turtle.

"No, no; the adventures first!" said the Gryphon impatiently. "Explanations take such a dreadful time."

So Alice began telling them her adventures from the time when she first saw the White Rabbit. After a while a cry of "The trial's beginning!" was heard in the distance.

"Come on!" cried the Gryphon. And, taking Alice by the hand, it hurried

off. . . . "What trial is it?" Alice panted, as she ran, but the Gryphon only answered: "Come on!" and ran the faster.

The King and Queen of Hearts were seated on their throne when they arrived, with a great crowd assembled about them—all sorts of little birds and beasts, as well as the whole pack of cards. The Knave was standing before them, in chains, with a soldier on each side to guard him; and near the King was the White Rabbit, with a trumpet in one hand, and a scroll of parchment in the other. In the very middle of the court was a table, with a large dish of tarts upon it. They looked so good that it made Alice quite hungry to look at them. "I wish they'd get the trial done," she thought, "and hand round the refreshments." But there seemed to be no chance of this, so she began looking at everything about her to pass away the time. . . .

The twelve jurors were all writing very busily on slates. "What are they doing?" Alice whispered to the Gryphon. "They can't have anything to put down yet, before the trial's begun."

"They're putting down their names," the Gryphon whispered in reply, "for fear they should forget them before the end of the trial."

"Stupid things!" Alice began in a loud, indignant voice, but she stopped herself hastily, for the White Rabbit cried out: "Silence in the court!" and the King put on his spectacles and looked anxiously round, to make out who was talking.

Alice could see, as well as if she were looking over their shoulders, that all the jurors were writing down "stupid things!" on their slates, and she could even make out that one of them didn't know how to spell "stupid," and that he had to ask his neighbor to tell him. "A nice muddle their slates 'll be in before the trial's over!" thought Alice.

One of the jurors had a pencil that squeaked. This, of course, Alice could *not* stand, and she went round the court and got behind him, and very soon found an opportunity of taking it away. She did it so quickly that the poor little juror (it was Bill, the Lizard) could not make out at all what had become of it; so, after hunting all about for it, he was obliged to write with one finger for the rest of the day. And this was of very little use, as it left no mark on the slate.

"Herald, read the accusation!" said the King.

On this the White Rabbit blew three blasts on the trumpet, and then unrolled the parchment scroll, and read as follows:

"The Queen of Hearts, she made some tarts,
All on a summer's day;
The Knave of Hearts, he stole those tarts,
And took them quite away."

"Consider your verdict," the King said to the jury.

"Not yet, not yet!" the Rabbit hastily



The Knave of Hearts who stole the tarts.

interrupted. "There's a great deal to come before that!"

"Call the first witness," said the King; and the White Rabbit blew three blasts on the trumpet, and called out: "First witness!"

The first witness was the Hatter. He came in with a teacup in one hand and a piece of bread and butter in the other. "I beg pardon, your Majesty," he began, "for bringing these in; but I hadn't quite finished my tea when I was sent for."

"You ought to have finished," said the King. "When did you begin?"

The Hatter looked at the March Hare, who had followed him into the court, arm in arm with the Dormouse. "Fourteenth of March, I *think* it was," he said.

"Fifteenth," said the March Hare.

"Sixteenth," added the Dormouse.

"Write that down," the King said to the jury; and the jury eagerly wrote down all three dates on their slates, and then added them up and reduced the answer to shillings and pence.

"Take off your hat," the King said to the Hatter.

"It isn't mine," said the Hatter.

"*Stolen!*" the King exclaimed, turning to the jury, who instantly made a memorandum of the fact.

"I keep them to sell," the Hatter added as an explanation; "I've none of my own. I'm a hatter."

Here the Queen put on her spectacles, and began staring hard at the Hatter, who turned pale and fidgeted.

"Give your evidence," said the King; "and don't be nervous, or I'll have you executed on the spot."

This did not seem to encourage the witness at all; he kept shifting from one foot to the other, looking uneasily at the Queen, and in his confusion he bit a large piece out of his teacup instead of the bread and butter.

Just at this moment Alice felt a very curious sensation, which puzzled her a good deal until she made out what it was. She was beginning to grow larger again, and she thought at first she would get up and leave the court; but on second thoughts she decided to remain where she was as long as there was room for her.

"I wish you wouldn't squeeze so," said the Dormouse, who was sitting next to her. "I can hardly breathe."

"I can't help it," said Alice, very meekly; "I'm growing."

"You've no right to grow *here*," said the Dormouse.

"Don't talk nonsense," said Alice more boldly; "you know you're growing too."

"Yes, but *I* grow at a reasonable pace," said the Dormouse, "not in that ridiculous fashion." And he got up very

sulkily and crossed over to the other side of the court.

All this time the Queen had never left off staring at the Hatter, who trembled so that he shook both his shoes off.

"Give your evidence," the King repeated angrily, "or I'll have you executed, whether you're nervous or not."

"I'm a poor man, your Majesty," the Hatter began in a trembling voice, "and I hadn't but just begun my tea—not above a week or so—and what with the bread and butter getting so thin—and the twinkling of the tea—"

"The twinkling of *what*?" said the King.

"It *began* with the tea," the Hatter replied.

"Of course, twinkling begins with a T!" said the King sharply. "Do you take me for a dunce? Go on!"

"I'm a poor man," the Hatter went on, "and most things twinkled after that—only the March Hare said—"

"I didn't!" the March Hare interrupted in a great hurry.

"You did!" said the Hatter.

"I deny it!" said the March Hare.

"He denies it," said the King; "leave out that part."

"Well, at any rate, the Dormouse said—" the Hatter went on, looking anxiously around to see if he would deny it too; but the Dormouse denied nothing, being fast asleep.

"After that," continued the Hatter, "I cut some more bread and butter—"

"But what did the Dormouse say?" one of the jury asked.

"That I can't remember," said the Hatter.

"You *must* remember," remarked the King, "or I'll have you executed."

The miserable Hatter dropped his tea-cup and bread and butter, and went down on one knee. "I'm a poor man, your Majesty," he began.

"You're a *very* poor *speaker*," said the King.

Here one of the guinea-pigs cheered, and was immediately suppressed by the officers of the court. . . .

"If that's all you know about it, you may stand down," continued the King.

"I can't go no lower," said the Hatter; "I'm on the floor, as it is."

"Then you may *sit* down," the King replied.

Here the other guinea-pig cheered, and was suppressed.

"Come, that finishes the guinea-pigs!" thought Alice. "Now we shall get on better."

"I'd rather finish my tea," said the Hatter, with an anxious look at the Queen.

"You may go," said the King; and the Hatter hurriedly left the court, without even waiting to put on his shoes. "—and just take his head off outside," the Queen added to one of the officers; but the Hatter was out of sight before the officer could get to the door.

"Call the next witness!" said the King. . . .

Alice watched the White Rabbit as he fumbled over the list, feeling very curious to see what the next witness would be like, "for they haven't got much evidence *yet*," she said to herself. Imagine her surprise when the White Rabbit read out, at the top of his shrill little voice, the name "Alice!"

"Here!" cried Alice, quite forgetting in the flurry of the moment how large she had grown in the last few minutes, and she jumped up in such a hurry that she tipped over the jury-box with the edge of her skirt, upsetting all the jurymen on to the heads of the crowd below, and there they lay sprawling about, reminding her very much of a globe of gold-fish she had accidentally upset the week before.

"Oh, I *beg* your pardon!" she exclaimed in a tone of great dismay, and began picking them up again as quickly as she could, for the accident of the gold-fish kept running in her head, and she had a vague sort of idea that they must be collected at once and put back into the jury-box, or they would die.

"The trial cannot proceed," said the King, in a very grave voice, "until all the jurymen are back in their proper places—*all*," he repeated with great emphasis, looking hard at Alice as he said so.

Alice looked at the jury-box, and saw that, in her haste, she had put the Lizard in head downwards, and the poor little thing was waving its tail about in a melancholy way, being quite unable to move. She soon got it out again, and put it right; "not that it signifies much," she said to herself; "I should think it would be *quite* as much use in the trial one way up as the other."

As soon as the jury had a little recovered from the shock of being upset, and

their slates and pencils had been found and handed back to them, they set to work very diligently to write out a history of the accident, all except the Lizard, who seemed too much overcome to do anything but sit with its mouth open, gazing up into the roof of the court.

"What do you know about this business?" the King said to Alice.

"Nothing," said Alice.

"Nothing *whatever*?" persisted the King.

"Nothing *whatever*," said Alice.

"That's very important," the King said, turning to the jury. They were just beginning to write this down on their slates, when the White Rabbit interrupted. "*Unimportant*, your Majesty means, of course," he said, in a very respectful tone, but frowning and making faces at him as he spoke.

"*Unimportant*, of course, I meant," the King hastily said, and went on to himself in an undertone, "*important — unimportant — unimportant — important —*" as if he were trying which word sounded best.

Some of the jury wrote it down "*important*," and some "*unimportant*." . . . At this moment the King, who had been for some time busily writing in his notebook, called out "*Silence!*" and read out from his book: "*Rule Forty-two. All persons more than a mile high to leave the court.*"

Everybody looked at Alice.

"*I'm not a mile high*," said Alice.

"*You are*," said the King. "*Nearly two miles high*," added the Queen.

"*Well, I shan't go, at any rate*," said Alice. "*Besides, that's not a regular rule; you invented it just now.*"

"*It's the oldest rule in the book*," said the King.

"*Then it ought to be Number One*," said Alice.

The King turned pale, and shut his notebook hastily. "*Consider your ver-*



The whole pack of cards came flying down upon her; she gave a little scream, and tried to beat them off. Then she found herself lying on the bank, with her head in the lap of her sister, who was gently brushing away some dead leaves that had fluttered from the trees on her face.

dict," he said to the jury, in a low, trembling voice. . . . "*No, no!*" said the Queen. "*Sentence first—verdict afterwards.*"

"*Stuff and nonsense!*" said Alice loudly. "*The idea of having the sentence first!*"

"*Hold your tongue!*" said the Queen, turning purple.

"*I won't!*" said Alice.

"*Off with her head!*" the Queen shouted at the top of her voice. Nobody moved.

"*Who cares for you?*" said Alice (she had grown to her full size by this time). "*You're nothing but a pack of cards!*"

At this the whole pack rose up into the air, and came flying down upon her; she gave a little scream, half of fright and

half of anger, and tried to beat them off, and found herself lying on the bank, with her head in the lap of her sister, who was gently brushing away some dead leaves that had fluttered down from the trees on her face.

"Wake up, Alice dear!" said her sister. "Why, what a long sleep you've had!"

"Oh, I've had such a curious dream!" said Alice; and she told her sister, as

well as she could remember them, all these strange adventures of hers that we have just been reading about; and when she had finished, her sister kissed her, and said: "It was a curious dream, dear, certainly. But now run in to your tea; it's getting late."

So Alice got up and ran off, thinking while she ran, as well she might, what a wonderful dream it had been.

THE FABLES OF ÆSOP THE SLAVE

THE OLD HOUND

A HOUND who had worked well in the hunt for many years at last became old and feeble. One day when hunting the stag he happened to be the first to come up to the animal, and seized him by the legs; but his old broken teeth were not able to hold tightly, and so the deer escaped. Thereupon his master flew into a great rage and began to strike the dog with his stick.

The poor old hound replied: "Do not strike your old servant. I would gladly serve you still, but I have not the strength. If I am not of much use now, remember how useful I have been."

Never despise old people because they are feeble and perhaps not very sharp. Remember how much good work they did while they were able.

THE TOWN MOUSE AND THE COUNTRY MOUSE

A COUNTRY mouse one day received a visit from another mouse who lived in the town, and who had been his playfellow when quite young. He did his best to provide the town mouse with nice food, but it was quite clear that he did not care much about it.

The town mouse presently said to him: "How can you put up with this horrid little hole in a farmyard where it is often cold and wet, when you might come to the town with me and live in a fine house and have all kinds of nice things to eat?"

He soon persuaded the country mouse, and the two set out that night to return to town, and safely arrived at the house where the town mouse lived. Here the country mouse found everything very comfortable. He sat on a rich carpet and ate scraps of all manner of nice things that had been served for supper. He was enjoying himself very much when suddenly the noise of someone opening

the door and the barking of two or three dogs that came running in nearly frightened the country mouse out of his wits, and he was just able to escape in time.

When he recovered his breath, he exclaimed: "If this is town life it will not do for me. I would rather have my poor quiet hole in the farmyard, where I can live in peace and safety."

We should not envy rich people, for they often have much more care and trouble than the poor.

THE MONKEY AND THE DOLPHIN

IT was an old custom among sailors to carry about with them little Maltese lap-dogs, or monkeys, to amuse them on the voyage; so it happened once upon a time that a man took with him a monkey as a companion on board ship. While they were off Sunium, the famous promontory of Attica, the ship was caught in a violent storm, and being capsized, all on board were thrown in the water, and had to swim for land as best they could. And among them was the monkey. A dolphin saw him struggling, and taking him for a man, went to his assistance and bore him on his back straight for shore. When they had just got opposite Piræus, the harbor of Athens, the dolphin asked the monkey if he were an Athenian. "Yes," answered the monkey, "assuredly, and of one of the first families in the place." "Then, of course, you know Piræus," said the dolphin. "Oh, yes," said the monkey, who thought it was the name of some distinguished citizen; "he is one of my most intimate friends." Indignant at so gross a deceit and falsehood, the dolphin dived to the bottom and left the lying monkey to his fate.

We should never pretend to be what we are not. We get nothing from such pretense except scorn.

THE NEXT STORIES ARE ON PAGE 1521.



The fine triple panel in Cologne Cathedral of the Adoration of the Wise Men, by Stephen Lochner.

THE GERMAN PAINTERS

IN Germany the art of painting had a slow and rather curious development. No leaping imagination, like that of Italian art, was here; nor do we find such clear vision as belonged to the Flemish artists. Germany produced two artists who stand in the first rank of genius, and a few other gifted men. But aside from these her expression in the arts of color and form was rather small and limited. Literature and music are the realms in which her greatest masters found their places.

Woodcarving was a form of art by which many Germans were able to express themselves most freely and naturally. Some of the painters were happier with a knife than with a brush; and we can see from their very pictures that this was so. The heavy draperies on the figures have a sort of wooden look, with none of the light and buoyant appearance that we remember as belonging to Gothic and Renaissance art.

To understand why German painting lagged behind and showed less progress than art in the neighboring countries, we must know that life there was different because the people themselves were different—more crude and awkward. In Germany at this time there was less culture, less learning, less feeling for beauty than in France

CONTINUED FROM 1228



and Italy. Among the rulers, those who might have been patrons of the arts, there were few who were alive to the interest and value of beautiful things. So there was little to encourage painters.

Those who did paint gave their thought mostly to presenting in their pictures the character and life of their own people, whose interests were chiefly material.

Yet in the fourteenth, fifteenth and sixteenth centuries, in spite of all discouraging conditions, schools of painting came into existence in various parts of Germany, at Prague and Cologne; in Swabia, Bavaria, Saxony and Alsace. Many of the paintings mentioned in terms of praise by chroniclers of the various periods have been lost; a great number are anonymous—for these reasons we have the titles given to unknown artists, such as The Master of the Altar of St. Bartholomew, The Master of the Life of the Virgin.

The first great known artist was "Master Stephan," or Stephen Lochner, who painted, about 1435, a famous picture in three panels called The Adoration of the Magi. This beautiful work is in Cologne Cathedral, and stands out as Germany's one glorious contribution to medieval art. Lochner was a happy painter of saints whose lives did not seem to be marked by

"prayer and fasting plenty." He had truly religious feeling, however, and he painted in colors brilliant and soft. He was skillful in composing groups, but his drawing was not always successful.

After the lonely greatness of Lochner there arose in Cologne a host of mediocre painters who imitated certain of the Flemish artists, notably Thierry Bouts and Roger van der Weyden. Some few were gifted men, such as the unknown painter of *The Descent from the Cross*, now in the Louvre. The qualities of the Cologne school were the same as those found in the whole art of Germany in the fifteenth and sixteenth centuries. The pictures produced were sturdy, realistic studies of men and women in whom culture and grace had no part. The greatest lack in all this work is the lack of good taste.

A FEW FINE FLOWERS IN A DESERT OF WOODEN ART

The spaces are overcrowded, the color is gaudy; a great many artists continued to use the gold backgrounds of Byzantine and early Christian art and never really learned perspective; thus the greatness achieved by men like Van der Goes and Brueghel, who, as we have seen, brought time and space into their backgrounds, was not even remotely imitated by their German neighbors.

Engraving on wood and metal was a favorite practice in many of the art centres of this time. Martin Schongauer of Colmar (the Swabian school), a follower of Van der Weyden, produced some very fine engravings as well as a number of paintings. The Virgin in the Rose Garden, now in Colmar Cathedral, is his best painting, but he got a quality into his engraved line that he could never equal in his brushwork. A pupil of Schongauer's, Burgkmair, was working about the same time in Augsburg, and there also Holbein the elder was busy.

Then there was Lucas Cranach, who lived from 1472 to 1553 and founded the Saxon school, and later Mathias Grünewald of Alsace.

Cranach, whose art is rustic with an attempt at elegance, succeeded, among the host of pictures and engravings he made, in painting one or two fine realistic portraits such as the Old Man, in the Brussels Museum. Cranach knew Martin Luther and painted his portrait.

Unfortunately the artist was very fond of taking subjects from Greek mythology, and in his hands the women whom the Greeks portrayed as gracious and beautiful became comical-looking creatures with large foreheads and narrow, slanting eyes.

TWO GIANTS WHO STALKED INTO THE WORKSHOP OF GERMAN ART

Grünewald was an artist who, so to speak, traded in horrors. His Crucifixion is so realistic as to make one's flesh creep. But Grünewald had the distinction of being a fearless colorist. He put into his pictures color used as a painter should use it. Others of his time used color in the way of an illuminator. But Grünewald was too melodramatic, too lacking in taste, to be great.

Toward the end of the fifteenth century, into this workshop and playground of little, busy men, there stalked two giants, Albrecht Dürer and Hans Holbein, who were destined to swing German art to new and unapproachable heights. Dürer, who lived from 1471 to 1528, is of an unrivaled greatness. He ranks with Leonardo da Vinci and Michelangelo, but stands apart from them in his vision, his style, in that which makes a man.

Dürer was the son of a goldsmith of Nuremberg. It was his father's wish that the boy should adopt his own trade, but when genius began to show itself this plan was discarded. Albrecht was apprenticed at the age of fifteen to Michel Wohlgemuth of the same town, an artist of but indifferent merit who is remembered chiefly for the connection with his famous pupil.

A LBRECHT DÜRER—PAINTER, VISIONARY, SEER, SCHOLAR AND POET

Four years later, Dürer started off on seven years of wandering and study, going to Colmar and Basle, across the Alps into Italy. He stayed at Venice for a time, where, of all the artists, Mantegna and Giovanni Bellini pleased him and informed him the most. In 1497 he was back at Nuremberg and set up a studio of his own. After a few years' work he went to Venice again and then returned to new activities in Nuremberg.

From 1507 onward he lived a life of constant work, literary study and creative thought; 1521 saw him visiting the Netherlands and "soaking in" the quali-

ties of the great Van Eyck. During his last few years Dürer worked under the great handicap of ill-health. He was not sixty when he died.

Dürer was not only a painter; he was a visionary, a seer, a great scholar, and he had the instinct of the true poet. In spirit he truly belonged to the Middle Ages and the Renaissance—a world that was hungry for knowledge, with skies always getting higher, and horizons rolling farther away. If we look at his work—having first learned how to look, that is to say, studying the pictures from Dürer's point of view—we can see something of this wonderful quality which the world has never since quite recaptured. We can see the artist thinking, learning, experimenting, working in one medium and another, and succeeding in imprinting with his pencil the life and adventures of the soul—adventures upon which he seems often to have gone forth.

He seems to have spent some time each day in the far land of the spirit. Hence we get the genius that created his noble pictures—The Knight and Death, Melancholy, The Repose in Egypt, The Mills, The Adoration of the Magi, and The Four Evangelists—this last the greatest contribution Germany has made to the world's art.

And this man, whose thoughts and imaginations carry him to such a height, is at the same time a very faithful portrait-painter. We can see this in such portraits as the famous Jerome Holzschuher, in the Berlin Museum, and The Young Girl in the same collection; in the portraits of Oswolt Krell, The Artist, and A Man, all three in Munich.

Dürer's most beautiful painting is The Adoration of the Magi, now in the Uffizi, Florence. There is something very delightful in the delicate gradation of tone; the composition, as in all Dürer's work, is faultless. His great masterpiece, The Four Evangelists, in Munich, has a simple grandeur that is almost unrivaled in painting.

DÜRER'S LINES AS FLEXIBLE AS THE STRANDS OF A SPIDER'S WEB

Nuremberg was famous for its wood-carving, and perhaps that is why the art of engraving and woodcutting is Dürer's greatest expression of genius. He might be challenged by painters of other countries, but in his engravings he stands alone. He was a master of line; his

heaviest lines are flexible as the strands of a spider's web. His engravings are filled with a wealth of minute detail, yet all the parts fit so harmoniously into place that the picture gives an impression of largeness, of grandeur. Not a buckle, a link of a chain or a nail, not one fold in a garment or one leaf on a branch escaped him. Dürer's fine pictures are the best answer to those artists who argue that they can gain largeness by "scamp-ing" in drawing.

When we look at these engravings and woodcuts we see Dürer working in this way because of his intense love for this medium of expressing himself. Outside influences may have caused him to excel in painting, but he was at home by himself in his engraving. And always behind the work we can see the thinker, engrossed in the eternal Why? of human questioning.

HANS HOLBEIN THE ELDER AND HANS HOLBEIN THE GREAT

Hans Holbein, who lived from 1497 to 1543, was Dürer's companion in greatness, but a man of a very different stamp. He had not the rock-ruggedness of Dürer, and he had a grace which was lacking in the older artist. While Dürer was forever searching and analyzing, probing human destiny with his finger, so to speak, Holbein was a very accomplished looker-on at life and fate.

Holbein began painting at Augsburg under his father, who is remembered only because of his son. Hans the younger early went away, to travel and work in various towns of Europe. He employed himself in many ways, from working at illuminated manuscripts to painting house-fronts. Before he was twenty years old he had painted and drawn a great deal, and some of this early work shows remarkable ability for so young an artist. Living at Basle, in Switzerland, for some time, Holbein made a number of portraits and other paintings there. Later, in England, he had the friendship of Sir Thomas More, and at one time was in the service of German merchants at the Steelyard in London. Later he became artist to Henry VIII and some of his nobles.

His well-known portrait of Sir Thomas More is in a private collection. In the National Gallery, London, is a masterpiece Holbein painted a year or so before he became attached to the English

PICTURES BY THE GERMAN ARTISTS



Katharine von Borg, by Lucas Cranach the Elder.



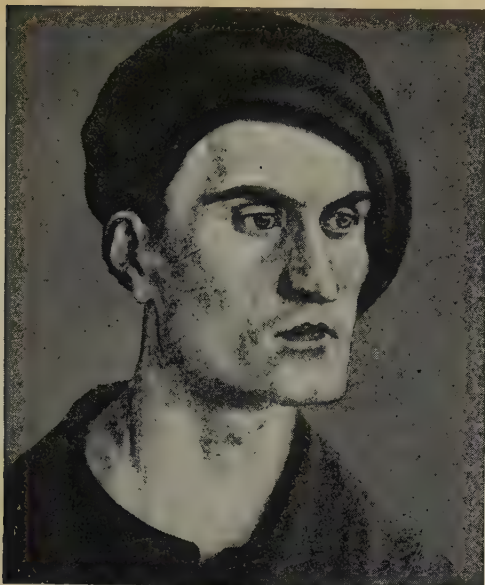
Portrait of Martin Schongauer, by Hans Burgkmair.



Albrecht Dürer's fine picture of The Adoration of the Magi.

Photographs of paintings on these pages by D. Anderson, F. Hanfstaengl, F. Bruckmann and E. Alinari.

PICTURES BY DÜRER AND HOLBEIN THE ELDER



A Portrait of a Young Man, by Albrecht Dürer.



A Portrait of Jerome Holzschuher, by Dürer.



Stephen Baumgartner as St. George, by Dürer.



The Death of Mary, by Hans Holbein the Elder.

court. It is a portrait group of two French gentlemen and is known as The Ambassadors. The portrait of the Duchess of Milan is in the same collection.

THE ONLY GREAT IDEALIST GERMAN ART HAS EVER KNOWN

All Holbein's portraits have his peculiar personal quality. He is very German in the thoroughness of his attention to detail, as we can see from the number of objects shown in a portrait like that of the Merchant George Gisze, in the Berlin Museum. He is distinctly un-

the nationality or the character of the persons painted. This artist, who was such a gifted observer, had seen a great deal of Flemish and Italian art; but he was not an imitator. It was part of his genius to be able to take the best of what he saw and make it his own. In this he was like Raphael.

A number of Holbein's pictures other than portraits are in existence—notably his famous group in Darmstadt Castle, the Meyer Madonna, where the Virgin and Child are painted as guests in the Burgomaster's family. This painting is



St. George and the Dragon, and a Knight and a Lady—two drawings by Albrecht Dürer.



German—a little French, perhaps—in his restraint and elegance.

The details never took his attention from the qualities of the persons he was painting. He showed in his canvases their coarseness and greed and meanness, their virtues and their loveliness. Over all he laid a curious dignity and nobility that was his own rather than the sitter's. In this way he was an idealist, the only great idealist that German art has ever known.

Holbein shows his strength by putting emphasis on the essential things in his work. All the details of his portrait groups are chosen not to fill up spaces, but to cast a light on the surroundings,

familiar through the copy which is in the Dresden Museum. A drawing of the wife of this burgomaster, in the Basle Museum, helps us to understand people who say that, great as Holbein was with his brush, he was greater with his pencil. In another person's hands the drawing would be a sketch; in Holbein's it is a finished study. There is another of these lovely drawings, done in red chalk, in Windsor Castle.

Holbein's genius was really divided between his portraits and his engravings. In engraving he shares his fame with Dürer; as portrait-painter he stands alone in his country's story.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 1495.

SOME OF THE MANY MASTERPIECES OF HANS HOLBEIN



Photo, Courtesy of the Metropolitan Museum of Art.

PORTRAIT OF MARGARET WYATT, LADY LEE



GEORGE GISZE, IN THE BERLIN MUSEUM



BONIFACE AUERBACH, IN THE BASLE MUSEUM



SIR THOMAS GODSALVE AND HIS SON JOHN, IN THE DRESDEN GALLERY



PORTRAIT OF A YOUNG MAN, IN THE
VIENNA GALLERY



HOLBEIN'S PORTRAIT OF HIMSELF, IN THE
BASLE MUSEUM



PORTRAIT OF ROBERT CHESEMAN, FALCONER TO KING HENRY VIII,
IN THE HAGUE GALLERY



THE MADONNA OF THE BURGOMASTER MEYER, IN THE DRESDEN GALLERY

The Book of WONDER



COULD WE REACH ANOTHER WORLD?

ONE of the greatest men that ever lived, Charles Darwin, said that the really unwise people were those who thought it specially wise to say that men would never be able to do or to know this thing or that, and the history of knowledge has justified him. But even when we remember what Darwin said, we are still inclined to think that the answer to this question must be no.

Jules Verne wrote a clever and delightful story about some men who were shot inside a huge cannon-ball to the moon; and even that is certainly not a possible thing now. But the moon is only 240,000 miles away, and the solar system would have to change a great deal for our earth ever to be within even 20,000,000 miles of another planet. Nothing could fire a hollow ball fast enough to go so far, even if the direction could be controlled, and even if people inside it could survive the shock of being fired off.

But let us suppose men could invent some machine that made power in itself, and could keep on doing so, such as a flying-machine. The first difficulty is that, when it got very high, even if the passengers took air with them to breathe, there would not be enough air for the machine to work against. In a vacuum—a space empty of air—the strongest bird could not soar or sustain itself. You might as

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well try to swim at the usual level in an empty swimming bath.

But even if this difficulty did not exist, there would be another which would be fatal. The passengers would have to travel millions of miles through the cold of space. None of us can imagine how cold that is, and it is certain that only a few minutes of it would freeze any human being to death. Even if they traveled to Mars with the speed of light—and we are sure they never could—they would be dead before they got there.

Whether we shall ever talk to another planet is quite a different story. Of course we must assume that the other planet, say Mars, has intelligent beings upon it, which is not impossible. If that were so, there is no real reason why we should not communicate with them in some way. They would have to learn how to understand what we meant; but that would not be nearly so difficult as it sounds. If there are intelligent beings on Mars they may be more intelligent than we are, for Mars is a much older world than ours, and there has been more time for these beings to learn and grow wise, if they are there at all. Indeed, perhaps they have been trying to attract our attention for ages, and are wondering when the earth-people will grow wise enough to attend to them. It has even been

suggested that what we imagine to be canals on Mars are really the signs of a colossal attempt to attract attention on earth. We cannot possibly say if this is so, but probably it is not so. At any rate, if there are people on Mars communication with them is by no means an impossibility; and if the people of Mars have telescopes as good as ours they could certainly see anything we wrote large enough across the desert of Sahara or across Siberia.

WHY DOES THE SUN FADE CARPETS AND NOT FLOWERS?

Before we can understand why colors fade we must understand something about the nature of color. A colored object is simply an object which reflects to the eye certain waves of light. Its power of reflecting light depends mainly on the way in which its molecules are built up. Now, the sun has power not only to give light and heat, but also to alter the chemical state of bodies, as we see when it turns silver nitrate black; and some of these alterations so affect the structure of the altered body that its surface reflects less light—that is to say, it fades.

Many artificial colors used in dyeing carpets pass through chemical and molecular changes when exposed to sunlight, and so fade; whereas the colors of living plants are more strongly built and so are not readily faded by the sun. When plants are dead, however, they usually fade quickly when exposed to sunlight, and there are some artificial colors that resist exposure to sunlight almost as well as the colors of living flowers.

WHY DO WE GET HOARSE WHEN WE HAVE A COLD?

We must understand that the voice is produced in a little box in the throat called the larynx, in which are two membranes called the vocal cords, stretching across the box. By their vibration and contraction, they produce the different noises and sounds which make our voice. Now, when we get a cold in the throat these vocal cords swell up and become filled with fluid, and are therefore thick and irregular. The result of this is that they are unable to produce a clear note, and so the voice sounds thick or hoarse. It is as if the string of a fiddle were soaked in hot water in places until it had become swollen or thick. It would then be unable to vibrate properly, and we could not produce a clear note with it.

WHY DOES A BRITISH SAILOR SALUTE THE QUARTER-DECK?

British sailors have inherited from their ancestors many customs and memories, which are honored to-day in circumstances quite different from those in which they originated. Every resident of a port to which ships of the British navy come has noticed the collar the sailors wear. This was designed of old time to protect his garb from the disfiguring effects of the greasy pigtail which, like a Chinaman, he wore. He wears mourning for the death of Nelson. But a stranger thing than this strikes visitors to a British ship. Every man in the fleet, as he steps upon the quarter-deck, gravely salutes. At first sight this appears a mark of respect to authority, but the meaning of the salutation is altogether different. The custom dates back centuries and centuries, and is older far than the salute to an officer with which we are familiar.

In the old days British war galleons and little ocean-going merchant argosies each had a crucifix on the quarter-deck, and, as the sailor passed, he reverently crossed himself, as Roman Catholics still cross themselves in the presence of a sacred image. The crucifix has vanished, but the tradition and the custom remain, and Jack Tar salutes where his predecessors used to reverence the image of Christ.

WHAT CAUSES CREAM TO FORM ON MILK?

Cream is mainly made of the fat of milk, though we should always remember that it also contains a lot of the invaluable protein or albumen, too, caught between the particles of fat. For the fat in milk is not simply melted or dissolved in it, but consists of a vast number of tiny round balls of oil. The Latin word for a "little globe" is *globulus*, and that is the proper name for these balls of oil.

When the milk is drawn, the oil globules are fairly equally distributed through it; but when the milk is allowed to stand, the oil, as it is lighter than the water in the milk, slowly rises to the top. If milk were pure water, the oil would rise at once; but protein and other things dissolved in it retard the forming of cream.

IS PHRENOLOGY REALLY AN EXACT SCIENCE?

There is certainly nothing at all absurd in the idea of phrenology, which is that by examining the head we may tell some-

thing of the brain, and therefore something about the person to whom the brain belongs.

That is one point. But, unfortunately, there is another. The idea is reasonable, but it cannot be used because the facts of the skull and the brain are against it. To begin with, the shape of the head and the shape of the brain do not much correspond—certainly not to an extent that would be of any use for phrenology. The skull is made of bones built in two sheets, with a space between. This space is in parts very large, and is filled with air or a loose, bony tissue.

This is the way in which the "bumps" are made upon the outside of the skull. Instead of corresponding to the brain, as the phrenologists pretend, they only correspond either to air or to loose, bony stuff.

DOES THE SHAPE OF THE BRAIN MEAN ANYTHING?

The fact that the shape of the head does not correspond to the shape of the brain is one fatal objection to phrenology. Another is still more serious. It is that the differences in the mere outside shape, even in the size and weight, of brains are probably of little importance. Sometimes a very able man has a small brain, or a stupid man a large one.

The differences between brains are of very great importance, but they are to be found only in the gray matter of the various parts, and in the number and shape and arrangement of the cells that compose the gray matter. These differences can be seen only when the brain is finely sliced and thoroughly and carefully examined by the microscope.

WHY DOES AN ICEBERG FLOAT?

If we were to judge by almost every other case we know, we should say that an iceberg must certainly sink. The rule is that when anything is cooled it gets denser—that is to say, heavier in proportion to its size. In other words, it contracts. If this were true of water, ice would have to sink, and our earth would not be the earth we know.

Water certainly contracts as we cool it down to 4° Centigrade above the freezing-point. But from this point downward water expands instead of contracting, so that ice is slightly lighter than the water around it. The difference is not very great: it is just enough to allow an iceberg to float with about seven-eighths of

itself below the surface of the water and one-eighth above it.

In the Antarctic Ocean one may see icebergs that are actually miles across, and they may rise two or three hundred feet above the surface of the water. Some of these huge floating masses of ice are shown on page 390. If we remember that there must be seven times as much ice below the surface as shows above it, we shall get an idea of the enormous size that masses of ice sometimes attain. The part below the surface is, of course, surrounded by liquid water, which is warmer than the ice. Consequently, by the laws of heat, there must be a flow of heat from the water to the ice, which therefore melts. The result often is that, after a time, owing to the destruction of the foundations, so to speak, the iceberg cap-sizes, and a new part of itself shows above the surface.

It has been lately proved that when ice is made very cold indeed, a point is reached when it begins to behave as other things do, and shrinks as it cools. But, fortunately, this point is far below any temperature that occurs naturally.

WHY DOES HOT WATER CLEAN THINGS BETTER THAN COLD?

When things are dirty, especially our skin or our clothes or the plates we have eaten from, the chief cause of the dirt, and the chief difficulty in getting things clean, is fat or oil. If we try to clean an oily plate with cold water, we cannot doubt this. Fat and oil are great catchers of dirt, and if we wash our fingers perfectly clean, and then rub a little butter on one hand, but not on the other, five minutes will show a great difference between the two hands.

Fat is simply solid oil, and oil is liquid fat. Whether the thing shall be solid or liquid is decided by the amount of heat in it. If it is hot, it is liquid, and then it can easily be got rid of. Hot water turns solid fat and half-solid fat into a liquid oil, and that is the reason why it cleans things better than cold water.

If the thing we have to clean has no fat or oil in it, we shall find that whether we use hot or cold water matters very little. But the mere fact that we commonly use our bare hands for washing things makes hot water more useful, as our hands themselves are producing fat or oil all the time, except when they are bitterly cold.

WHY CANNOT WE GRASP A BAR TIGHTLY WHEN WE FIRST WAKE UP?

When we are taken captive by intense laughter we cannot hold tightly to things, and the same is true in some other states of mind, as when we wake up. In all such cases we know that the necessary muscles are there, as large as ever, and so we may be sure that the explanation is somewhere else.

It may be in the nerves that carry the orders to the muscles, but if we consider what it means to be just awakened, or to be laughing very heartily, we shall agree that the key is to be found in the brain, for plainly the brain is in an unusual state in both cases. Further, it is the part of the brain concerned with the will that is at fault. During sleep the willing parts of the brain are at rest, and are only very scantily supplied with blood. Not until we are wholly awake do the centres of will get into action. Till then our voluntary acts are feeble, though acts not under the will, such as the beating of the heart, go on as well as ever. In intense laughter the centres of will are starved of energy, which is being drained away very quickly in expressing our feelings. That is why intense laughter leaves us exhausted.

WHAT MAKES A FAIRY RING?

Fairy rings are made of a kind of fungus. Now, it is the great mark of all kinds of fungus—including those we eat, which we call mushrooms—that they contain no leaf-green, such as we find in grass or in the leaves of trees. It is by means of this leaf-green that green plants live on the air. Those which are without it have to feed like animals, not on the air, but on solid or liquid things.

Animals can move to the food they want; but plants, even funguses, cannot. Let us suppose that a fungus starts at some place in the ground, and that an old one, as it dies, buds off new ones all around. The place where they started will soon have all the food taken out of it, but outside that place there will be some more food. So the new funguses can grow on the outside, but not on the inside. On the inside of the growing line the food material is constantly being used up, and so a fungus gradually dies. This means that a ring will be formed, and as time goes on this ring will grow bigger and bigger as the new funguses growing

on the outside of the ring spread out in search of new soil that still contains the food upon which they can live.

This is not the explanation that is suggested in the name fairy rings, but it has the advantage of being true. There are many legends told in various parts of the country about these wonderful rings, and so, perhaps, there is some excuse for superstitious folk looking upon them as a kind of magic circle.

WHY IS IT THAT IRON DOES NOT BURN AWAY IN THE FIRE?

When anything burns away in the fire, what happens is that the substance of it has combined with the oxygen of the air to form compounds called *oxids*. Sometimes these oxids are in the form of gases that fly away into the air, and so the thing wastes; and sometimes they are in the form of solids which usually crumble away very readily. What the fire has to do with it is this. Most things will not combine with oxygen until they are warm, and the fire simply raises them to the temperature at which they can begin to burn, as when we apply a lighted match to the wick of a candle.

But it is not true that iron does not waste with fire. However, it wastes very slowly at the temperature of an ordinary fire. Iron is capable of being burned, as most other things are, but it requires a high temperature. At lower temperatures, however, iron burns, or wastes, slowly; it even does so in the absence of fire altogether, especially if there is a certain amount of moisture. This wasting of iron we call rusting, and the rust is made of iron combined with oxygen, though the process is not quite so simple as it sounds. Iron is not the only metal which slowly combines with oxygen at ordinary temperatures.

WHY WILL A SLATE PENCIL WRITE ON SLATE BUT NOT ON PAPER?

The kind of pencil we use for writing on slate writes simply because the slate is hard enough to rub it down when it is pressed. Paper is not hard enough to do this; if we press very hard we tear the paper. We require not only hardness, but also a certain degree of roughness, to enable us to write. Neither an ordinary pencil nor a slate pencil will write on glass, because the glass is so smooth that there is not friction enough to rub off the tip of the pencil as we move it.

THE NEXT WONDER QUESTIONS ARE ON PAGE 1449.



Alexander Pope.



John Dryden.

POETS OF A DULL DAY

AFTER the splendid outburst of poetry at the end of the sixteenth century, with Shakespeare as its bright, particular star, there came a solemn afterglow in Milton. Then followed a period of rather dull decline.

With the return of Charles II to continue in England the line of Stuart kings, everything French was made the fashion, and in the writing of books, criticism ruled the style. A French critic named Boileau set himself the task of teaching the world how to write according to classical models, and in France and England alike, in poetry and prose, writing became regulated by rules.

The two English poets of this formal school whose names stand out most boldly in the period from 1650 to 1750 are John Dryden and Alexander Pope. Each of them was a fair poet, but neither of them was great. Though they did not write any poem which is an imperishable literary possession, they form interesting links in the chain that binds together the centuries of English literature.

John Dryden was born at the Rectory of Aldwinkle All Saints, in Northamptonshire, on August 9, 1631. Like Milton's, John Dryden's parents were Puritans; but unlike Milton, Dryden did not, throughout his life, remain



faithful to the religion of his youth. Indeed, his character cannot alto-

gether be admired, for a great part of his life was spent in supplying the theatres, that had reopened with the restora-

tion of Charles II to the throne, with plays of so vulgar a nature that they could not possibly be performed in public to-day.

Of course, the taste of the English people has greatly improved since the days of Charles II, when it was at its lowest, and the aim of all good people in our time is to keep public performances pure and free from vulgarity. Instead of trying to do this, the Puritans simply shut the theatres, and perhaps did harm in that way, for as soon as the playhouses were reopened, the low-minded men and women who flattered and fawned upon the pleasure-loving king took advantage of their new liberty by encouraging the most vulgar performances. It is to the shame of John Dryden, gifted as he was with splendid poetic powers, that he did not disdain to earn his living by pleasing the bad taste of his time. Thus we can never think of him with the personal admiration that we have for Milton, who received only a small sum for one of the noblest poems of all times, while Dryden was earning a good living by helping to lower public taste.

We do not know much about the early life of Dryden, except that he was educated at Westminster School, under Doctor Busby, a famous headmaster, who, although noted for his powers in thrashing his pupils, was admired and respected by all who came under his discipline. As a schoolboy Dryden was fond of writing verses, and, also, when he studied at Trinity College, Cambridge, he continued his poetic exercises; but he does not seem to have been a scholar of any particular note. He inherited a small income, not sufficient to support him, and shortly before his marriage with Lady Elizabeth Howard, the eldest daughter of the Earl of Berkshire, he turned to writing for the newly opened theatres as a means of support. On the whole, his plays, though frequently containing notable passages, are unworthy, and we have only to compare the best of them with the poorest of Shakespeare's to realize how very poor they are, although Dr. Samuel Johnson, one of the least trustworthy of critics, would seem to rank Dryden before Shakespeare.

**JOHN DRYDEN, THE POET LAUREATE
WHO WAS A JACOBITE**

When James II, brother of Charles II, came to the throne, and England seemed likely to become a Roman Catholic nation, as the new king wished to impose that church on the country, Dryden also became a Roman Catholic. This is often mentioned to his discredit; but there is little doubt that the poet was not guilty of the meanness of changing his religion to curry favor with the new king. He had been tending for some years toward the Roman Catholic faith, and, later, when William and Mary were called to rule the land after James had fled, Dryden remained a faithful Catholic, thereby losing what he had previously gained in the way of royal favor.

One of his most beautiful poems, *The Hind and the Panther*, is written in praise of the Roman Church, which he likens to the "milk-white hind, immortal and unchanged," the Church of England being the panther, "fairest creature of the spotted kind," while the other Protestant Churches are likened to other animals of different kinds.

**WHEN DRYDEN WAS AN OLD MAN AND
POPE WAS A LITTLE BOY**

Dryden's great power took the shape of satire, and some of his finest verse is that

in which he gives us biting pictures of historical personages. In his later years he adapted into English verse the works of the Latin poet Virgil, and, although these translations were well received, they do not give us a very good idea of the original, which is warm with all the sunshine and glowing beauty of nature; whereas Dryden's verse is cold and glittering, like diamond-studded jewels.

He wrote some poetry that has real poetic quality. His *Ode on St. Cecilia's Day* and his earlier *Song of Praise of Music* are good examples. This stanza from the *Song* will show the poet's mingled sweetness and power when he was a poet only.

What passion cannot music raise and quell?
When Jubal struck the chorded shell,
His listening brethren stood around,
And, wondering, on their faces fell
To worship that celestial sound.
Less than a God they thought there could
not dwell
Within the hollow of that shell,
That spoke so sweetly and so well.
What passion cannot music raise and quell?

**THE GREAT MIND THAT FAILED FOR
WANT OF A LOFTY PURPOSE**

Dryden also wrote *Absalom and Achitophel*, the first published satire in the English tongue, except Samuel Butler's *Hudibras*, composed about the same time. Satire is not a high form of poetry, but it often accomplishes something. It was used by the ancient poets to expose public abuses and wrongdoers and has often done much good in arousing honest instincts. On the other hand, it is often used cruelly, for scorn may be a foul weapon. People flayed by a clever poet's taunting words can rarely answer back in the same strain, even if they would. Besides, satire may sometimes take aim against goodness instead of evil.

Dryden's satire, *Absalom and Achitophel*, was written to prevent Charles II from nominating the Duke of Monmouth as his heir instead of his brother James II. Since then all writers of English satires have had Dryden's poem in mind.

On May 1, 1700, Dryden died and was buried in Westminster Abbey. When he was an old man, the most eminent literary figure of his day, there were people always keen to see him on his daily visit to a coffee-house where many men of note were in the habit of meeting. It is said that one day, not very long before he died, the celebrated poet was pointed out to a

little boy who had been brought there by a friend; and this pale-faced and delicate little fellow, when he grew up to be as famous as Dryden had been, never forgot this glimpse of his master. Already, as a boy of eleven, Alexander Pope was an intense admirer of Dryden's poetry, and had begun to write poetry himself, imitating Dryden's style. Despite his delicate health and stunted form, Pope was a marvelous student when only a child, and by the age of twelve he had written some quite remarkable poems, at least one of which, *On Solitude*, might be taken for the work of a thoughtful man.

He was born in London on May 21, 1688. His father was a wealthy linen-draper, who had joined the Roman Catholic Church, like Dryden, and who, in disgust at the new reign of William and Mary, had withdrawn to a house near Windsor Forest, where the early years of his son Alexander were spent.

THE BOY OF SIXTEEN WHO RESOLVED TO BECOME A GREAT POET

The boy received some instruction from priests and other masters, but had no regular education, though his great thirst for learning and the wonderful activity of his young mind perhaps did more for him than the ordinary course of education would have done. He was extremely well-read in the classic authors, and throughout his poetry we find him constantly making use of the ancient stories of gods and heroes of Greece. He was only sixteen when he determined to be a poet, and before he was twenty-three years old he had finished and published his famous *Essay on Criticism*, a comparatively short poem, full of remarkable literary knowledge and ripe judgment. It contains many lines which are constantly quoted, such as "To err is human, to forgive divine" and "A little knowledge is a dangerous thing." This poem left no doubt that its young author was a genius.

Although on the whole Alexander was not what we should call a lovable character, he was probably a better friend, and kindlier, than his poems would suggest, for, like Dryden, much of what he wrote was inspired by the unfriendly spirit of satire. He was the very opposite of a natural writer, as every line was of clearly artificial style, even when full of force and vigorous movement. Thus, he was peculiarly unfitted to translate the great Greek poems of the *Iliad* and the *Odyssey*, of

which we read on page 1983, which are full of the grand and solemn music of nature; yet his translations of these books were so popular that he was paid \$40,000 for the work. Less than sixty years before, Milton had received two payments of \$25 for *Paradise Lost*. If we were to reverse the two sums, we should be placing the proper values on the relative merits of the works.

POPE'S PLACE IN ENGLISH LITERATURE

With the money which he thus earned, Pope bought a beautiful villa on the bank of the river Thames at Twickenham. There, as the friend of most of the great men of his time, the rest of his life was passed, and other famous poems were written, chief of these being *The Dunciad*, in which he satirizes all the lesser literary men who did not happen to be his friends. The *Essay on Man* was another of the notable works written at Twickenham.

If it is by no means a pleasant picture of the poet which we gather from his writings and the stories told about him, we have to bear in mind that all his life was spent in physical suffering. "When the poor little man got up in the morning," says one writer, "he had to be sewed into stiff canvas stays, without which he could not stand erect; his thin body was wrapped in fur and prunelle; and his meagre legs required three pairs of stockings to give them a respectable look." On May 30, 1744, this strange little poet died, and was buried at Twickenham, where Pope's villa is still one of the best-known houses.

His supreme claim as a poet was that he was the greatest of all masters of poetic form as it was admired in his day. The rule for the couplet which he brought to perfection, was that in poetry lines should rhyme in adjacent pairs, and that a single thought should be compressed, if possible, into a single line, or at most into two lines.

Hope springs eternal in the human breast;
Man never is, but always to be, blest.

True wit is Nature to advantage dressed,
What oft was thought, but ne'er so well expressed.

Here the lines are crisp and strong and packed with meaning. The thought may not be great, but it is neatly handed out. That is Pope's general style. It catches the ear and lodges in the memory.

THE NEXT STORY OF LITERATURE IS ON PAGE 1477.

JULIUS CÆSAR, THE FOREMOST MAN OF ROME



JULIUS CÆSAR CONDEMNING VERCINGETORIX, A REBEL CHIEFTAIN IN GAUL, NOW FRANCE



THE DEATH OF JULIUS CÆSAR IN THE SENATE-HOUSE IN ROME, STABBED BY HIS FRIENDS

Julius Cæsar became the foremost man in all the world. He set himself to rule the Roman Empire and to make wise laws. But there were some who thought he wanted to be king, a thing hateful to all Romans, and for this ambition that Cæsar was supposed to have, although he thrice refused the crown, they killed him at the foot of the statue of Pompey, his dead rival. But Cæsar's power was well founded, and his adopted son, Octavius, became the first of a long line of emperors.

The Book of MEN AND WOMEN

THE MEN OF THE ETERNAL CITY

IN ancient times, hundreds of years before the first Christmas Day, there was already standing on the banks of the river Tiber, in Italy, the city of Rome. And, as time passed, this "city of the seven hills" became the mistress of almost the whole of the world that was known to her people. After a time Rome's lordship was taken away, and new empires arose; but Rome herself, when the influence of Christianity came into the world, won a new dominion over the minds of men, the head of the Christian Church in Rome being looked upon as the head of the Christian Church everywhere. And though once more that dominion, too, was shaken off by the countries which became Protestant, there are still great numbers of Christians in all nations who look upon the Pope of Rome as their spiritual head; and still Rome stands upon the banks of the Tiber, so that men call her the "Eternal City." We read here of some of the great men who built up her power.

THE FIRST GREAT MEN OF ROME

THE Romans said that their city was founded by a king named Romulus, and that after him there reigned six more kings. Five of those six helped to make Rome great, either because they were skillful warriors or because they made wise laws. But the seventh king was called Tarquin the Proud, because in all things he sought his own wealth and pleasure, trampling upon the people, instead of making it his aim to secure their welfare like the wise kings before him. And his sons were like him.

There was a young man among the nobles whose name was Lucius Junius; and he was also called Brutus, which means "blockhead." But, in truth, he was keen-witted, and only made a pretense of dullness. For he saw that Tarquin the Proud feared clever men, and sought to destroy them, lest they should become powerful and overthrow him. Yet, though Tarquin did not know it, there was no one in Rome whom he had more cause to fear than this Brutus.

There is a story that the king once sent two of his sons, and Brutus with them, to consult the Oracle of the temple at Delphi, which men believed could foretell

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the future. And when they had asked the questions as the king had told them, then the sons of Tarquin asked the Oracle:

"Which of us shall rule in Rome hereafter?" And the

Oracle answered: "He that shall first kiss his mother." As they left the temple, the stupid Brutus tripped and fell; but he had done this on purpose, so that he might kiss the earth, which is the mother of all men. The rule of Tarquin grew worse and worse; and nobles and people groaned under his tyranny, till their anger was ready to break out in fierce flame. And then a son of Tarquin, named Sextus, did wrong to Lucretia, the wife of one of the nobles—wrong so deep and bitter that after she had told her story to her husband, in the presence of her father and Brutus and another noble, named Publius Valerius, she slew herself with a dagger.

Thereupon Brutus dropped his pretense of stupidity; he snatched the dagger from her heart, and called on all present to pledge themselves to rid Rome of the tyrant Tarquin and his evil sons. Then they went out and told the people in Rome what had befallen; for Tarquin was away at the head of an army. Brutus made haste

to the camp, and there he called upon the soldiers to rise up against Tarquin. And Tarquin and his sons had to fly to another city, nor could they ever win back their power in Rome. But the Romans made oath that they would never again have a king in Rome, and instead of a king they set two consuls at the head of the state. One of them was Brutus.

BRUTUS, WHO DROVE THE TYRANT FROM ROME AND CONDEMNED HIS OWN SONS

So the name of Brutus was ever held in high honor in Rome as the man who had driven the tyrant forth from her gates and made her a free Commonwealth. Moreover, it is told of Brutus that he set to all men an example of stern justice, even when it must have almost broken his own heart. For it befell that his own sons were drawn into a plot to restore the Tarquins; and, when Brutus learned the truth, he did not use his power to spare his own flesh and blood, but spoke the doom of the traitors with his own lips. Reckoning his duty to his country more highly than his love for his family, he condemned his sons to death.

For many a long year the Romans had constant wars with one or another of the neighboring cities, and many troubles within, between the nobles, who were called Patricians, and the commons, who were called Plebeians. For the nobles held the rule and were often oppressors. And slowly the commons gained more and more share in the government. A time came when the power of Rome was in danger from the victory of the city of Veii. The Romans sent out armies and besieged Veii, but could not take it until they placed their forces under the command of a noble named Marcus Furius Camillus.

CAMILLUS, WHO WON GREAT FIGHTS AND BADE THE CHILDREN FLOG A TRAITOR

Now, Camillus found that he could make a hidden passage underground, called a mine; and, unknown to the people of Veii, he made a mine under the wall of Veii, and dug it so that his soldiers could burst their way out into the temple of Juno. Then he ordered a great attack to be made on the walls, so that all the people of Veii gathered to defend them. Then, when the whole of the city was defending the walls. Camillus himself led a troop into the

mine, and they broke through and opened the gates of the city, so that its people were utterly conquered.

It is told of Camillus that in one of the wars, when he was besieging another town, he won honor for the Romans by a generous action. For there was a schoolmaster who thought to win favor with the Romans, and by a trick managed to take the school children out of the town and bring them to the Roman camp, so that the people of the town would agree to anything to get the children back. But Camillus bound the traitor's hands, and bade the children flog him back to the city. Some say that afterward, when the Gauls sacked Rome, Camillus, who was in exile, returned and defeated them. Some say that his last public act was to persuade the leaders of the nobles and commons to agree together and be at peace. But, at any rate, his memory was honored as of one who, all his life, did good service to his country.

REGULUS, WHO GAVE UP HIS LIFE FOR THE SAKE OF ROME

The next famous man of whom we have to tell won no great victories for Rome. For he was in command of the Roman army when it was warring against the city of Carthage, in Africa; and the men of Carthage defeated the Romans and took many prisoners. Among the prisoners was the general Regulus. The victors held Regulus captive; but when some Carthaginian nobles were captured in another battle with the Romans, they sent messengers to Rome, and Regulus with them, offering to set Regulus and other prisoners free if their own men were set free. But Regulus, instead of begging the Romans to agree, so that he might come home again, told them that it would be wiser to refuse, since they had less need of him than the Carthaginians had of their men. So it was that Regulus returned to captivity in Carthage, rather than let Rome suffer even a little for his sake. And for this he deserved the higher honor, because he knew that the Carthaginians would be enraged against him and put him to a painful death.

In that war the Romans defeated the Carthaginians in the end, but the power of Carthage was not destroyed; and some of her people went to Spain and there made a new power, drawing the

BRUTUS CONDEMNING HIS SONS TO DEATH



THE TRAITOR SONS OF BRUTUS APPEALING TO THEIR FATHER FOR FORGIVENESS



THE GRIEF IN THE HOME OF BRUTUS WHEN THE BODIES WERE BROUGHT IN

In the early days of Rome, when Tarquin the Proud was king, the king and his sons were so cruel that the people groaned under them, and a young nobleman named Brutus called upon the people to drive the Tarquins out of Rome. They were driven out, and afterward some false Romans plotted to bring them back. Among the traitors were Brutus's own sons; then Brutus set to all men an example of stern justice. He condemned the traitors to death, though they were his own sons.

peoples of Spain under their rule or into company with them. They built a city which they called New Carthage, and they did this because they thought that, possessing Spain, they would again be able to make war successfully against the Romans.

SCIPIO, THE YOUNG HERO WHO WON SPAIN AND AFRICA FOR ROME

It was in one of those battles with Carthage that Cornelius Scipio first fought, being then but a boy. They say that Scipio saved his own father's life. After that his father was sent to Spain, to fight the Carthaginians who were there, and was killed. Then none of the Roman generals were willing to go to Spain, knowing how hard a task was before them; but Scipio, though yet very young, offered to undertake it. For he felt sure in his heart that he could conquer Spain for Rome.

Moreover, the people were so moved by his noble bearing and his persuasive speech, and by the courage he had shown, that they gave him the command. When Scipio was come to Spain the soldiers took heart; for they had loved his father and now they followed the son with fearless devotion.

First of all, they captured the enemy's city of New Carthage, and then defeated them in other battles, until their power in Spain was broken altogether. Then Scipio returned to Rome, and persuaded the Romans to send him with an army across the sea against Carthage itself.

The power of Carthage was laid low, and Scipio was called Africanus, because he conquered the land of Africa. At last there came a time when he saw that some men envied him and others distrusted him for the tales that were told of him by his enemies, and then he ceased to take part in public affairs, scorning to defend himself against charges of baseness. So Scipio retired into the country and passed the end of his days as a private citizen.

CATO THE CENSOR, WHO WAS FAMOUS FOR THE ROMAN VIRTUES

Among these enemies of his was Marcus Porcius Cato, called the Censor. Cato was a man who was famous for what men call the old Roman virtues, for he proved himself a warrior reckless of his own danger, yet shrewd and wary, and one who held with firm doggedness

to every purpose he set before himself, and to every rule of life he laid down. Moreover, he scorned all manner of easy living, and would have had all men to live as carefully as himself. But Cato was hard and harsh, not fearing pain himself and careless whether others suffered, regarding only the things that he considered useful, and despising the things that make life lovely and gracious as well as the things that are merely pleasant and the things that are harmful. And so, because Scipio was not of a like ungracious temper, Cato was very ready to think ill of him.

Cato's name of Censor was given to him because in Rome Censor was the title of a great officer of state who was guardian of public morals; and when Cato was himself appointed to this office he was very rigid in punishing whatever he thought foolish or unseemly, fearing the great and powerful no more than the humble and mean, so that his rule as Censor remained in men's memory a reminder of the older Roman virtue.

THE GRACCHI, WHO STROVE FOR THE PEOPLE AGAINST THE NOBLES

The daughter of Scipio, who was called Cornelia, was wedded to a certain Tiberius Sempronius Gracchus; and they had two sons, named Tiberius and Gaius. Cornelia did not care to make a show of jewels, although she was wealthy, but would point to her two boys and say: "These are my jewels."

Now, after the Romans had overthrown Carthage, their armies vanquished many foreign foes, and the power of Rome became very great. But in Rome and in Italy the people suffered grievously. For since the old nobility had ceased to have all the power, a new order of nobles had sprung up out of those families whose members had held high office, and these new nobles tried, like the old patricians, to keep the power all in their own hands.

These senatorial families had managed to get possession of the new lands that Rome had won, so that everywhere were great estates tilled by the slaves of these nobles, and the old free yeomen farmers of Italy seemed likely to disappear altogether. But when Tiberius Gracchus was grown up, he tried to make things better for the common folk, and to make the landowners give up to them the lands to which he said they really had

no right. Still, though he wished that they should be fairly paid for what they lost, the nobles were very angry, and said that Tiberius was going about to win the favor of the commons and to make himself king.

The nobles and their followers then fell upon the followers of Tiberius, and Tiberius himself was struck down and murdered in the fray. But Gaius, the younger brother, waited his time, and after some years he, in turn, came forward as the people's champion, seeking also to give power to other Italians by making them citizens of Rome. But, most of all, Gaius desired to humble the

thereon not that she was the daughter of the great Scipio, but that she was "the mother of the Gracchi."

Now you can see how the Roman state became divided between a Senate party and a popular party; and while the foreign wars went on, it came about that whenever a successful general won the favor of his soldiers he could use his army to give his own party power. Thus, the popular party triumphed under Gaius Marius, and again the Senate party seemed to have crushed them under the merciless leader Sulla. The blood of both parties was spilled like water, and, instead of seeking the common weal, it seemed



Regulus going back to Carthage to die a captive for the sake of Rome.

nobles who had done his brother to death, and by his eloquence and boldness he came near to gaining his end. Yet, when they saw that the nobles were better prepared to fight, his supporters were afraid, and again the nobles and their followers fell upon them and slew many. And when Gaius saw how fickle the people were, and that they were willing, as he said, to remain slaves, he bade his faithful servant to thrust his sword into his heart. So the servant slew him, and then, for the love of his dead master, slew himself by his side. But in after-time the people honored the memory of these brothers, whom we know now as the Gracchi, and set up a statue of their mother Cornelia, writing

that every man cared only for his own gain, or, at best, for the gain of his party; so that some began to see that there would be no settled order in Rome, but endless strife, until there should arise some one man strong enough and wise enough to crush all quarreling parties and to take the government into his own hands and rule with the good of the whole state as his aim.

Among the Senate party, their great captain Sulla saw signs of great talent in a very young man whom we call Pompey. Therefore, Sulla raised him to high command, while other people sneered at him as a boy. But the boy led armies with great success, and when he returned from Africa, where he over-

threw Sulla's enemies, Sulla hailed him by the title "Magnus," which means "great." But, after all, Pompey did not prove to be really a very great man, though for a long time it seemed that he might possibly become the savior of the Roman state. For he was a skillful soldier, and, besides that, he was kind-hearted and had a way that made him popular.

Then, while he was still a young man, he broke away from the Senate party and became the chief of the people's party, and almost the chief man in the state. Soon after this he was appointed to destroy the bands of pirates who sailed over the Mediterranean Sea, and then he went to take command of the Roman armies in Asia, where there was a war going on against Mithridates, the cruel king of Pontus.

It was some years before Pompey finished that war successfully, and during the war there was in the city another man who was laying his own plans to become master of the Romans. This was the most famous of all Romans, Julius Cæsar.

CÆSAR AND POMPEY, THE FOREMOST MEN IN ROME

Cæsar had always belonged to the popular party, though he himself belonged to a noble family. He saw that if he wished to win power he must make himself a favorite with the people; and he saw, too, that the next thing would be to make Pompey feel that if they two joined together they could rule the Roman world; although there was a third, Crassus, who, because of his vast wealth, was a sort of rival to Pompey. When Pompey came back from the war with Mithridates, Cæsar managed so that the three agreed to act together; and no doubt Pompey thought he was himself going to be the chief of the three, seeing that Cæsar was as yet without practice in the wars, though famous as an orator. Yet it was Cæsar who was able to devise measures that pleased the people.

Now, Cæsar knew very well that the time would come when there would be open strife whether he or Pompey should be the head of the state, and he got himself appointed to be governor of the province of Gaul, which means France. But as there were many warlike tribes in Gaul he required an army

to bring them into subjection, and with this army he very soon showed that he was one of the most skillful soldiers that ever lived, with a wonderful power over his followers. Cæsar wrote a book of his wars in Gaul, which is a model of what such a book ought to be. While he was there, he crossed the English Channel and fought the ancient Britons; but he only wished to see what the country was like, not to conquer it, so he went back to Gaul. The real conquest of Britain was not made until about a century later, in the days of the Cæsars.

HOW THE STRIFE GREW UP BETWEEN CÆSAR AND POMPEY

But Pompey stayed at Rome, and made friends again with the Senate party. The news of Cæsar's victories in Gaul made him afraid that his rival would come back to Rome with his army and seize the chief power in the state; and Pompey thought that by staying at Rome he could best make sure of being strong enough to check Cæsar. And when Cæsar saw that the time had come when he must either march to Rome at the head of an army or be thrust from power altogether, he led his troops across the river Rubicon, which was the boundary of his province. But since no governor might lead armies except in his own province, this was as much as to declare war upon the Roman Government. So now, when people do something which binds them to go on, and makes any turning back impossible, they are said to have "crossed the Rubicon."

THE FLIGHT OF POMPEY AND HIS SAD DEATH, AND CÆSAR'S GREAT GRIEF

Then Pompey found that his own warlike prowess was forgotten, whereas the deeds of Cæsar were fresh in men's minds; and the soldiers everywhere declared in favor of Cæsar, so that Pompey had to fly from Italy. But afterward he gathered a great army in Greece, and to Greece at last came Cæsar to fight him. At the battle of Pharsalia Pompey was overthrown and forced to fly from there to Egypt; but, as he was landing, a murderer stabbed him in the back, and the head was hewn from his dead body. But when Cæsar also came thither, and Pompey's head was brought to him, he shed tears, and put the murderer to death. For this was notable in Cæsar, that he was, like Scipio,

THE GREAT ELOQUENCE & SAD DEATH OF CICERO



CICERO DELIVERING ONE OF HIS GREAT ORATIONS IN THE ROMAN SENATE



CICERO ABOUT TO DIE AT THE HANDS OF MARK ANTONY'S TROOPS

Cicero was the great orator of Rome in the days of Pompey and Julius Cæsar, and his speeches are looked upon even now as models for orators. The top picture shows Cicero denouncing the treachery of a senator, whom we see sitting, listening anxiously, at the end of the seat on the right. After the murder of Julius Cæsar, however, Cicero took the side of his murderers, which made Mark Antony so angry that he had him put to death. Cicero fled from Rome, but Antony's friends caught him and put him to death.

of a merciful mind, ready to take into favor even those who had fought against him.

WHAT CÆSAR DID, AND WHY THEY PLOTTED TO TAKE HIS LIFE

And, having thus come to be the foremost man in all the world, Cæsar set himself to put the ruling of the great domains of Rome in order, and to make wise laws. But there were some who thought he would like to be crowned king, a thing hateful to all Romans; and some who wanted to get the power back into the hands of the Senate; and others who had private grudges against Cæsar, and who could count among their number not a few of the most powerful men in the state. Complaint and opposition grew into action.

So they plotted to take Cæsar's life, and one day, as he stood near the statue of his dead rival, Pompey, they came to him, pretending to make a petition, and thereupon drew their swords, stabbed him to death, and sent men through the city crying that Rome was freed from the tyrant. They forgot that, though Cæsar fell, either some other must take his place or the empire of Rome must be rent in pieces. For Cæsar had found and shown the only way to hold it together, and his adopted son, Octavius, was destined to become the first of the Roman emperors, Cæsar Augustus. But Octavius was only eighteen, and none thought he would take the place of Julius.

HOW MARK ANTONY STIRRED UP THE PEOPLE

But one Marcus Antonius, whom we commonly call Antony, who was a clever man and a friend of the murdered Cæsar, got leave by fair words to speak to the people, whom he stirred up to a great fury against those who had slain Cæsar. And after that none knew for a long time who would get the upper hand. But the young Cæsar, Octavius, made common cause with Antony, and presently those who had slain Cæsar and those who would avenge him were at war. Antony and Octavius overthrew the other party, of whom the most famous now is Marcus Brutus, by reason of the play of Julius Cæsar which Shakespeare wrote. This Marcus Brutus was one of those who had taken the side of Pompey in the war with Cæsar, and yet had been treated with great favor by Cæsar afterward.

But he was so full of the belief that the rule of one man in Rome must be bad for the state—perhaps because he remembered that the first Brutus was called great because he drove out the Tarquins—that he had joined the conspiracy against his own friend. And it is said that when Cæsar saw him with his sword drawn he did not care to defend himself, but only said: "And thou too, Brutus!" and so fell, pierced by his friend's sword.

There was another famous Roman of those days whose name is known to everyone—the orator Cicero. He, too, was among those who took Pompey's side, but was afterward treated by Cæsar with favor. It is said that the reason why the conspirators did not ask him to join them was, that they thought he would expect them to pay too much regard to his opinion, although they did not really think him a wise man.

CICERO THE ORATOR, ANTONY THE SOLDIER, OCTAVIUS THE EMPEROR

However, after the murder, Cicero made many famous speeches on their side in opposition to Antony. Then Antony was so angry that Cicero was one of the people whom he specially named to be put to death; and when some of Antony's friends caught Cicero, they cut off his head and his hands and sent them to Antony. Besides being a great orator, so that his speeches are looked upon as models even now, Cicero wrote books which tell us more about those times than any other writings we have.

After the death of Cæsar it seemed at first that Octavius and Antony would divide the world between them; but later they also went to war, since both wished to rule. And though Antony was the elder and a practiced soldier, yet he was vanquished by Octavius; because he loved Cleopatra, the queen of Egypt, and she loved him; and she persuaded him to remain in Egypt with her when he should have been making ready for his strife with Octavius.

So, by land and sea, Antony was defeated, and when he saw that all hope of victory was gone he slew himself; and there was none left to stand between Octavius and the lordship of the Roman world. Over this wide extent of territory the heir of Julius Cæsar ruled successfully for many years.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 1455.



THE SHEEP AND GOATS

ONE of the newest wonders of the world is the discovery of radium in the Belgian Congo. To civilization radium is worth many times the price of the purest diamonds, though to the poor savages in whose midst the discovery has come radium is as useless a mystery as a deposit of grand pianos or old manuscripts.

When we put on a coat made of wool and stitched together with cotton, we have there the product of two simple, natural marvels the discovery of which has meant more to mankind than the revelation of radium.

The little hairs that form around the seed of the cotton plant acquire a natural twist as they grow. The sheep is clothed with multitudes of wool fibres which are furnished with scales tending to make the fibres curl and cling one to another. Thanks to this natural twist of the cotton we can spin it into threads and form materials to clothe three-fourths of the population of the world. The structure of wool makes it possible to weave it into cloth and a thousand other things.

From those two simple secrets of nature have grown up the cotton and woolen industries, which are among the most important in the world. In cotton we keep a man cool and comfortable at the Equator. In wool we keep him warm at the Poles.

CONTINUED FROM 1268



The man who tamed the first sheep, then, prepared the way for all the conquests which bodily warmth helps a man to achieve. He prepared clothing to enable Madame Curie to withstand the cold of the frigid old shed in which she wrested radium from its ore. It is well that we should understand, as early man probably did not, nature's greatest gift.

As Robinson Crusoe clad himself in the skins of goats after eating their flesh, so early men wrapped themselves in the woolly hides of the sheep they killed. Every time a human being needed new raiment a sheep must die. Supposing that rule had continued, and each of us wanted one warm garment: if we killed all our flocks we should have less than half a skin for each of us.

Even Australia has only eighty or ninety million sheep, and Argentina less than half as many. The world could not be clothed by killing all the sheep. That little trick of the woolen fibre has done away with the need to kill the sheep for its covering. We harvest our wool as we gather the fruit of our orchards. Australia keeps her sheep alive, clips nearly seven hundred million pounds of wool one year, and will clip as much the next year.

In our own small way we have a little gold mine in the sheep. The breeders live by the sale of the animals;

the shepherds by tending them. They fertilize the land on which they feed. The farmer pays his bills with the price of his wool; the man without sheep who allows other farmers' sheep to graze on his land pays his bills with the help of the money thus gained.

PERHAPS THE GOOSE THAT LAID THE GOLDEN EGGS WAS A SHEEP

The wool reaches the factories and builds up such wealth that some of these manufacturing towns are said to be, for their size, the richest in the world. The cloth passes to the tailors and other traders, and finally to those who wear the clothes. Great Britain is the greatest manufacturer of woollen goods and sells a great deal to other nations. We do not manufacture enough to clothe ourselves.

It is impossible to guess where or by whom the first sheep were tamed. We should raise a monument to the man if we but knew; and another to the man who first discovered how to secure the wool and keep the sheep alive. Perhaps, after all, the goose of the fable was a sheep, and the golden eggs a fleece!

But we must not forget that the modern fleece is the result of scientific breeding. Wild sheep are hairy, not woolly. There may be a woolly undercoat for some, but in general the coat resembles the goat's in being short hair, though with that precious tendency to curl and fall together.

For long ages man has kept the breeds in which the tendency to wool has been constantly developed, so that at last he has fixed types as securely in fleeces as he has in apples and pears. Yet the force of instinct is restrained, not destroyed. Neglected flocks, or flocks which become poor through various causes, lose their luxuriant woolly overalls and drift back to hair. The St. Kilda sheep grows yearly more hairy.

THE BIG-HORNED RAM WHICH LEAPED FOUR FEET INTO THE AIR

Nor is that the only instinct against which we have to guard. There are others which we have never bred out of sheep through all the long years they have been in captivity. Rams are at times as fiercely combative as rhinoceroses. The writer was one of half a dozen people scattered like reeds by a big-horned beauty which leaped four feet into the air and came, a true battering-ram, at us from its pen. Another has been seen to knock an ox fairly over.

Their love of playing King of the Castle is but battle lore bred in lambs—a rehearsal of the combats they may fight in high places when age and anger prompt them to serious contests.

The most mysterious impulse is also the most tragic—that is, the follow-my-leader feeling which may lead to self-slaughter. We all know the habit. A little flock is being ferried from one side of a river to the other. As the steamer nears the landing-stage a big athletic ram seeks to quit the ship too soon. The shepherd puts up his staff to bar the way; but the ram clears it at a bound, and reaches the gangway. The shepherd withdraws the obstacle and gives the remainder free passage. But every one of them leaps at the same spot, and to the same height, over nothing!

That would be splendid if all had leaped to imitate their leader in springing over a chasm or in eluding a lurking wolf; but here it is merely a foolish loss of energy. It is instinct in its dotage.

TWO THOUSAND SHEEP THAT FOLLOWED THEIR LEADER OVER A PRECIPICE

Follow that a step farther to Grenoble, where two thousand sheep, in October, 1922, were being brought down for the winter from their mountain pasture at Treney d'Oisans. A dog frightened the leading ram, which jumped down a precipice. The whole flock tried to follow. The shepherd interposed; but a resistless torrent of life surged round him and overbore him, and the sheep plunged down to death, carrying their shepherd with them. That was the same instinct, which had become stark madness.

Another point equally interesting, but less known, is the ability of the hardier breeds of sheep to endure privation. On January 7, 1917, tremendous snowstorms overspread Great Britain. Long after town damages had been made good woe-ful stories of missing sheep appeared in the papers. Twenty-eight days passed and then a little flock was dug out of the snow alive. Another flock came to light out of fifteen feet of snow after much the same period. Time slipped away, and each week brought more wonders, until after six weeks men thought the tale was ended.

Even then, a shepherd near Belford in Northumberland retained his faith in the endurance of his favorites, and on February 24 he found his last lost ewe alive beneath the snow that had buried her

THE GREAT SHEEP AND GOAT FAMILY



THE ABYSSINIAN MANED SHEEP, WITH ITS MAGNIFICENT CURLING HORNS



THE FAT-TAILED SHEEP, WITH ITS TAIL WEIGHING MANY POUNDS



One-horned Sheep.



Long-tailed Goral.



Musk-ox.



An Argali in the mountains.



Two-horned Indian Sheep.



Leicester Shearling Ram.



Wensleydale Ram.



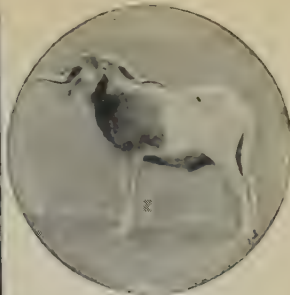
A Blackface and her baby lamb.



Tahr.



Rocky Mountain Goats at home.



Hausa Sheep.



Merino Ram.



Hampshire Ram.



Suffolk Ram.



Dorset Horned Ram.



A goat and her family of pretty little kids.



Mouflon.



Ibez.



Takin.



Four-horned Sheep.



Chamois.



Domestic Goat.



Markhor.



Wallachian Sheep.



Barbary Sheep.



Bharal Sheep.

forty-eight days earlier. Even that record was later eclipsed. A little black-faced Scottie was rescued on a farm in Durham after fifty-four days of starvation in a snowdrift—eight weeks all but two days!

This must not mislead us into believing it not important to feed sheep. These poor animals were able to defy death because the conditions were ideal for them. The sheep were fat; they could not move head or foot, and so were prevented from making any exertion to exhaust energy; their temperature was high and constant; they lived indolently upon the great reserves of fat stored within their bodies.

Hibernation, the fasting winter sleep of animals, must have begun in some such way as this, when our Ice Age was here; when animals advanced northward as the ice retreated in summer, and turned southward as it returned in winter.

Many must have been snowbound on the way south. Many must have fasted and survived; many must have perished. The successful migrants might transmit their powers of resistance to their descendants, and true winter fasts would slowly come within the powers of creatures whose existence depended upon their survival of winter imprisonment.

SHEEP AS BIG AS DONKEYS WHOSE HORNS WERE USED AS FOX-HOLES

It is almost certain that in course of time, if the conditions recurred frequently, skilled breeders might evolve a race of hibernating sheep from the hardy strain of Cheviots, Blackfaces, and other hill breeds that weather such storms.

Sheep-owners have no need of such sheep, so they will not make the attempt. They go on from year to year improving flesh and fleeces from existing stocks. Probably the wilds have nothing better to give them than the breeds they already possess, for sheep-breeding is as ancient as the oldest Bible days.

From what stock our domestic breeds come we do not know. There are several wild species, creatures of the mountains all of them, though not of the steeper heights to which the goats resort. Bighorns we call the first famous members of the family, found in America and Asia. In North America the bighorns are called Rocky Mountain sheep, but they range far from the mountains from which they take their name. They are big, active animals—the males over forty inches at

the shoulder—and with horns fifty inches long. The coat is hairy with a soft woolly under-fur. Light brown, generally, the bighorn is white or yellowish in Alaska, and black in the Cassiar district of British Columbia, white again in Kamchatka, and brownish gray in Siberia.

A still finer wild sheep is the argali of central and northeastern Asia. These are animals as big as donkeys, with noble, curving horns of such size that little mountain-foxes and other animals use them as homes when they become detached.

MARCO POLO THE FIRST TO DISCOVER AND DESCRIBE THE ARGALI SHEEP

Various local races of the argali are found in various areas. It gives all lovers of Marco Polo a thrill to find that he was the first European to discover and describe them. That was in 1273. Exactly six hundred years later a European scientist first saw the old Venetian's animal, and named it Marco Polo's sheep. Not till then was Marco Polo's story believed.

The Asiatic urial, or shapo, is among the most timid of wild sheep; yet when men hide, or are absent, it will pop down from its rocky home and enjoy a browse with domesticated sheep. Which does it covet, the good pasture or the companionship? Men have no time to learn, for it goes like the wind at their approach.

Noting the existence of the old red or Gmelin's sheep in Asia, we pass to the famous European mouflon, now confined to Corsica and Sardinia. The rams carry horns as much as thirty-eight inches in length; they stand nearly thirty inches high at the shoulder, are powerfully but neatly built, and are very wild and wary.

HOW THE DIFFERENT BREEDS WERE DEVELOPED

From such sheep as these the breeds we know must have come, but it is certain that, could the early fathers of the wild flocks see their descendants, they would not recognize them as kindred.

Just as man has been able by careful selection for generations to develop many different breeds of dogs and cattle, so we find many distinct breeds of sheep which differ more or less. All have one or more qualities, such as hardiness, flesh or type of wool, which are valuable in a special section or in a particular market. There is no best sheep for every part of a large country.

So many breeds have been developed that it is hard to group them all. Great

Britain has the most varieties, but Spain and France have some famous breeds. Most of our sheep came originally from one of these countries. Sheep may be divided in several different ways. There are mutton breeds, wool breeds, mountain breeds, lowland breeds, long-wools, medium-wools, short-wools, fine-wools and so on.

THE MOST WIDELY DISTRIBUTED BREED COMES FROM SPAIN

The merino is the most widely distributed sheep. It developed in Spain, and from there has been taken all over the world. The wool is fine, and the sheep thrives in poor pasture, but it makes poor mutton. So in many countries the merino is crossed with one of the larger breeds, such as the Lincoln. The weight and quality of the flesh is improved, and the fineness of the wool is not much injured. The Rambouillet has been developed in France from merino stock, and many have been taken to other countries.

Of the many British breeds, the best known long-wools are the Leicester, Border Leicester, Lincoln and Cotswold.

The Leicester is one of the most important and shows the progress of all. In little more than a century and a half it has been improved from a gaunt, coarse sheep of heavy inferior wool into a good quality of flesh and fleece. It is often crossed with other breeds.

The Border Leicester has Leicester characteristics combined with the hardihood of sheep that thrive in the North. Supreme size is attained by the ancient Cotswolds and their rivals, the Lincolns. The Romneys are ancient and famous for their resistance of foot-rot and an independence of spirit which causes them to keep apart and so avoid overcrowding of pasture. Ireland has only one native sheep, the Roscommon, which turns sparse hillside herbage into good mutton and wool.

EXCELLENCE OF SOUTHDOWN MUTTON DUE TO A DIET OF SNAILS

The short-wools give us nearly a dozen classes. The most important are: Southdown, Shropshire, Suffolk, Hampshire Down and Oxford Down. The Southdowns are famous, not for size but for their mutton and the excellent quality of their wool. They began their career as a breed of fame at the same time as the Leicesters, and have relations in many of our distinguished breeds.

One point of interest is that the peculiar excellence of Southdown mutton arises from the multitude of microscopic snails they eat. Snails teem on the herbage of the Downs, and snails and grass go together to stay a Southdown appetite. The Shropshire Down and Dorset Horned flocks give the earliest lambs; the Shropshires put on flesh and wool at express speed. They are very popular abroad, and many are shipped to other countries.

Life is anxious and arduous for the mountain sheep, yet our domestic breeds are in conditions nearest those which wild sheep enjoy, so we need not be surprised that they are the most numerous. About fifteen breeds are recognized in Great Britain.

MOUNTAIN SHEEP THE UNCHALLENGED OWNERS OF THEIR HILLS

These animals do wonders in surroundings which would be impossible to cattle, not only because of the rough country, but also of the scarcity and poor quality of food. Yet their flesh is esteemed for its quality, and their wool, though of less value than other breeds, is abundant and admirable for coarser manufactures.

Nature is mindful of their conditions, and not so many lambs are born to mountain sheep as to breeds in more favored pastures. Their hardihood is shown by the feats of endurance already mentioned in favor of the Blackface. If attempts at improvement are made by the introduction of other sheep into mountain flocks, stern winters soon destroy them, and the mountaineers remain unchallenged owners of their hills.

There is a fascinating story about the Herdwicks—that they descended from forty sheep which swam to land from a Spanish Armada ship cast ashore at Drigg. The facts, however, are even more romantic. If historians of the breed have told their story aright, the Herdwicks are Vikings, descendants of sheep carried centuries ago by the hardy Norseman to the Isle of Man, and taken thence when they added Cumberland to their dazzling gains.

Passing to foreign breeds, we note the hairy long-legged sheep of Guinea; the gnu-like Hausa sheep with their curious spiral horns; a black and white hairy Zulu sheep which produces wool in England; the fierce Hunia sheep of India, of which the rams are kept for fighting, as bulls are in Spain; and also the unicorn sheep of Nepal.

Unicorn there never was, but as the two horns of the unicorn sheep grow together into one stout back-curving horn we call it the unicorn sheep. The growth of this appendage is often so excessive that it has to be cut at the tip to prevent it from growing into the back of the ram. For a contrast we have the Wallachian sheep, whose long horns, twisted like corkscrews, branch fantastically out to right and left.

Another freakish growth is the tail of the fat-tailed sheep, many pounds in weight. Often men brace it, to prevent injury, by a board, with sometimes even a little wheeled-trolley attached.

The sheep are so nearly allied to the goats that only the scientist can say positively where the line is to be drawn. Three points we may fix with certainty. Goats always take the highest part of a range. Male goats have an unpleasant odor; sheep have not. Goats may have beards, but sheep never have them.

Where sheep are lacking, goats serve many people for milk, cheese, flesh and clothing. Their fault is that they are terribly destructive. They eat practically anything, including trees, vines and shrubs. It is said that in old times goats were responsible for the desert conditions existing around the Mediterranean.

Tur are the closest goat allies of the sheep. Their home is in the Caucasus.

They are at home near snows but not in the highest ranges. The Spanish wild goats of the Pyrenees are their nearest kindred in the goat family, but the common wild goat, over a yard high and with wonderful horns curving in a noble sweep over fifty inches long, ranges from Europe

into Asia. They are superb climbers, making dizzy leaps with perfect accuracy. They are able, in case they slip and topple over, to use their horns to save their lives.

Goat-keeping is probably as ancient as sheep-keeping. In Asia, Africa and Southern Europe millions are kept for their flesh, their skins and their milk. In English-speaking countries they are not so popular, though leather from kids or goats is much used for gloves and shoes.

Our domestic goats were brought from abroad, but until recently farmers have paid little attention to them. There were a few on many farms, but more were kept as pets. Nowadays many

Angora goats are being kept for their fleeces in some parts of the United States and Canada. There are great goat ranches in Texas, New Mexico and other states. These animals originated in Asia Minor and their long curly coats are known as mohair. They like rough land, where they feed on the shrubs, and the flesh of the kids is much liked. Their skins also make leather, though it is not



Sheep in New Zealand coming down from the hills to water.

so good as that from the common goat.

The demand for goat's milk is growing, as the animal suffers little from tuberculosis. Many are kept to furnish milk for children and invalids. The Toggenburg and the Saanen, both from Switzerland, are best liked, and some give over a gallon a day.

We must mention the Angora goat, which is noted for its long silky hair. When one of this breed is shorn the average amount of wool from each animal is two and a half pounds. In addition to its wool the Angora goat is bred for its meat qualities. Unfortunately the female is not a careful mother, so it is sometimes difficult to raise the kids.

Domestic goats have turned back to a wild state on many islands such as the Canaries, the Hebrides, the Azores, some islands off the west coast of British Columbia, and in the distant regions of new settlements deserted by settlers. These animals lose all their domestic traits and acquire an even greater cunning than animals born in a wild state. For instance, an estate on Vancouver Island had passed through many hands, and at one time the temporary owner possessed some goats. These animals escaped to an island near by. For years no one saw hair or hide of them. Finally a new proprietor started to clear the underbrush from the woods on the island. To the astonishment of the workmen, they were constantly putting to flight some black goats. Old inhabitants of the district identified the animals as the ones that had "gone wild" years before. Although the workmen did their best, they could not come within any reasonable distance of the former domestic goats. Probably the creatures were able to outwit their would-be captors by the knowledge they had gained in man's service.

THE GOAT FAMOUS FOR ITS CLIMBING POWERS AND DASHING COURAGE

Passing on again, we reach another wild tribe, the agile ibexes, common to the Alps, to Arabia and Abyssinia, and widespread in Asia. *I* stands for ibex, says the alphabet rhyme, and we may note that *A* stands for all its homes.

Its splendid horns, scimitar-shaped and marked by bold cross-ridges, its fine climbing and dashing courage, make the ibex famous among all who frequent mountains. They make him too famous, in fact, for in Europe he is almost extinct,

thanks to the zest of "sportsmen." The noble markhor, forty-three inches at the shoulder, is preserved for the present from a like fate by the fact that its home is in the far mountains of India, Kashmir and Afghanistan. Its blood is thought to run in some domesticated breeds of goats.

Tahrs, goatlike animals of the Himalayas; the gorals, which link goats with antelopes and with the serows, lead us to the takin, an animal which long defied capture in the mountain jungles of Tibet.

There, too, in stable and paddock, munches the weird-looking musk-ox. It used to be placed by naturalists as a connecting-link between sheep and cattle; but it is now classed with the takin, serow, goral and Rocky Mountain goat. Creatures of the Arctic Circle, musk-oxen are of ancient type, and in colder epochs roamed freely over Europe, even extending to England. When the ice-sheet covered a large part of the United States they were common, but have now retired far to the North. But they hate men and wander far from their haunts. Even in captivity they are morose and dangerous if we enter premises that they regard as their own.

THE LEAPING FEATS OF THE DARING AND GRACEFUL CHAMOIS

The Rocky Mountain goat already named belongs to the goat-antelopes. It is the clumsiest in build of all the goat clan, but in spite of its stocky limbs it is a fine climber. It is the only pure white animal of the family. Its home is on the heights, and it seems now as sure to survive man's coming as the closely guarded bison.

The same remark, let us hope, may now be applied to the delightful chamois, the leaping beauties that seem the very embodiment of Alpine life. They have been much persecuted, but their range is not limited to the Alps. They are in the Pyrenees, Carpathians, Caucasus, Apennines, and in the Taurus, in Asia Minor.

Also they are in New Zealand! A few were taken there some years ago and have thriven splendidly. There is nothing more thrilling in nature than the sight of a chamois glissading down a snowy slope, to bound afresh up a new height and land like some queer bird with all four dainty hoofs gathered together upon a space no bigger than a man's hand. For daring, adroitness and grace the chamois is the little king of his order.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 1441.

The Book of POETRY

POETRY OF JOY AND SADNESS

LEARNED men have for hundreds of years disputed as to just what makes up true poetry. They do not agree except in one particular, and that is, that true poetry must be written under the stress of feeling or emotion. In this way poetry differs most strongly from prose, which oftenest is written under the guidance of sense or logic. Feeling is the very origin of poetry. In the early peoples exultation after victory, mourning for death, were expressed in song.

OUR FEELINGS IN POETRY

TO make his fellow-men share something of the joy that is filling his own heart is one of the greatest things the poet can do. Indeed, all great things in literature have been accomplished when men and women have given to the world a powerful impression of their own inner thoughts, feelings and experiences.

We are all moving through life to the life that is beyond—our earthly pilgrimage, it is called; and nothing can be more interesting to us than to know what is happening to our fellow-pilgrims and what they think of the great journey. Those of them who have the power to tell us are our great poets and philosophers.

But joy is not the only feeling the poet experiences. Far from it. Sadness is often the feeling that comes to the thoughtful mind; joy more often keeps company with the thoughtless. The poet knows all our feelings: joy, sadness, hope, and the many different shades of these. We may call them "moods," meaning the frame of mind we may be in at one time, which will be quite different from our feeling at another. Poetry is the only lasting way of expressing these varying feelings so that they may be recalled long after they have passed away.

Now, this power to enter into the moods of others, and to draw hope from the words of the poets, is a great and precious thing. Hence, the writers whose poems have most human feeling in them are most likely to be of service to mankind. It must not be supposed that we can profit by reading only what we may call the poetry of joy—that is to say, cheerful poems.



Sorrow and sadness are quite as important to make our life complete; nay, they are

needed to make us truly happy. We could not know true joy if we never knew what it was to be sad. So the poet must

at times sing songs of sadness. Milton, as we shall learn later, wrote two fine poems—they are quite short, and can each be read in ten or fifteen minutes—the one entitled *L'Allegro* and the other *Il Penseroso*.

The titles are taken from the Italian, and mean "the cheerful" and "the pensive." That is to say, the first is a poem written, as it were, by a cheerful man, and the second by a melancholy man. The cheerful man looks at nature and the world with the singing of the lark, and the melancholy man with the notes of the nightingale.

The one begins, "Hence, loathed Melancholy!" and the other, "Hence, vain deluding Joys!" Yet both are the work of the same poet, and convey the feelings that must come to all of us in our different moods. The use of sadness in poetry is to purify our thoughts, to balance our minds; for if we were always laughing with the jesters we should in time become incapable of earnest thought, and, as Longfellow tells us:

Life is real, life is earnest,
And the grave is not its goal.

From a wise mixture of joy and sadness springs hope, and so we are enabled to endure the trials of life. English poetry is full of hope, because it is healthy, sane, and in love with the fresh, green country.

OLD FOLKS AT HOME

This well-known song by Stephen Collins Foster is a great favorite with many singers, and expresses the feelings of a Southern negro after the desolation of the Civil War had swept the South bare, and thrown the negroes out into the world to depend almost entirely upon their own resources.

WAY down, upon de Swanee Ribber,
Far, far away,
Dere's wha my heart is turning ebber,
Dere's wha de old folks stay.
All up and down de whole creation
Sadly I roam,
Still longing for de old plantation,
And for de old folks at home.

All de world am sad and dreary,
Ebery where I roam;
Oh, darkeys, how my heart grows weary,
Far from de old folks at home!

All round de little farm I wandered
When I was young,
Den many happy days I squandered,
Many de songs I sung.
When I was playing wid my brudder
Happy was I;
Oh, take me to my kind old mudder!
Dere let me live and die.

One little hut among de bushes,
One dat I love,
Still sadly to my memory rushes,
No matter where I rove.
When will I see de bees a-humming
All round de comb?
When will I hear de banjo tumming
Down in my good old home?

All de world am sad and dreary,
Ebery where I roam;
Oh, darkeys, how my heart grows weary,
Far from de old folks at home.

OLD IRONSIDES

AY, tear her tattered ensign down!
Long has it waved on high,
And many an eye has danced to see
That banner in the sky;
Beneath it rung the battle shout,
And burst the cannon's roar;—
The meteor of the ocean air
Shall sweep the clouds no more.

Her deck, once red with heroes' blood,
Where knelt the vanquished foe,
When winds were hurrying o'er the flood,
And waves were white below,
No more shall feel the victor's tread,
Or know the conquered knee;
The harpies of the shore shall pluck
The eagle of the sea!

Oh, better that her shattered hulk
Should sink beneath the wave!
Her thunders shook the mighty deep,
And there should be her grave;
Nail to the mast her holy flag,
Set every threadbare sail,
And give her to the god of storms,
The lightning, and the gale!

—OLIVER WENDELL HOLMES.

A VALEDICTION

Many good-bye poems have been written in honor of dear ones who have become temporarily separated from us, but none excels *A Valediction* by Elizabeth Barrett Browning.

GOD be with thee, my beloved,—God be
with thee!
Else alone thou goest forth,
Thy face unto the north,
Moor and pleasance all around thee and be-
neath thee,
Looking equal in one snow;
While I who try to reach thee,
Vainly follow, vainly follow,
With the farewell and the hollo,
And cannot reach thee so.
Alas, I can but teach thee.
God be with thee, my beloved,—God be with
thee!

Can I love thee, my beloved, can I love thee?
And is this like love, to stand
With no help in my hand,
When strong as death I fain would watch
above thee?
My love-kiss can deny
No tear that falls beneath it;
Mine oath of love can swear thee
From no ill that comes near thee,—
And thou diest while I breathe it,
And I—I can but die!
May God love thee, my beloved,—may God
love thee!

MOTHER

This beautiful picture of motherhood is taken from Alfred, Lord Tennyson's play *The Princess*. It cannot be doubted that the lady who is described was his own mother.

ONE
Not learned, save in gracious household
ways;
Not perfect, nay, but full of tender wants;
No angel, but a dearer being, all dipt
In angel instinct, breathing Paradise,
Interpreter between the gods and man,
Who looked all native to her place, and yet
On tiptoe seemed to touch upon a sphere
Too gross to tread, and all male minds perforce
Swayed to her from their orbits as they moved,
And girdled her with music. Happy he
With such a mother! faith in womankind
Beats with his blood, and trust in all things high
Comes easy to him, and though he trip and fall
He shall not blind his soul with clay.

THE SWEETEST LIVES

In our Book of Poetry we have used many of the beautiful poems written by Elizabeth Barrett Browning. None of them holds a truer lesson than *The Sweetest Lives*.

THE sweetest lives are those to duty wed,
Whose deeds, both great and small,
Are close-knit strands of an unbroken thread
Where love ennobles all.
The world may sound no trumpets, ring nobells;
The Book of Life the shining record tells.
Thy love shall chant its own beatitudes
After its own life-working. A child's kiss
Set on thy sighing lips shall make thee glad;
A poor man served by thee shall make thee rich;
A sick man helped by thee shall make thee
strong;
Thou shalt be served thyself by every sense
Of service which thou renderest.

NATHAN HALE

Washington needed information about the British army. Young Captain Nathan Hale volunteered to get this. He was taken prisoner by the enemy and hanged as a spy. He died regretting that he had but one life to give for his country. The poem below was written by Francis Miles Finch.

TO drum-beat and heart-beat,
A soldier marches by:
There is color in his cheek,
There is courage in his eye,
Yet to drum-beat and heart-beat
In a moment he must die.

By starlight and moonlight,
He seeks the Briton's camp;
He hears the rustling flag
And the armed sentry's tramp;
And the starlight and moonlight
His silent wanderings lamp.

With slow tread and still tread,
He scans the tented line;
And he counts the battery guns
By the gaunt and shadowy pine;
And his slow tread and still tread
Gives no warning sign.

The dark wave, the plumed wave,
It meets his eager glance;
And it sparkles 'neath the stars,
Like the glimmer of a lance—
A dark wave, a plumed wave,
On an emerald expanse.

A sharp clang, a steel clang,
And terror in the sound!
For the sentry, falcon-eyed,
In the camp a spy hath found;
With a sharp clang, a steel clang,
The patriot is bound.

With calm brow, steady brow,
He listens to his doom;
In his look there is no fear,
Nor a shadow-trace of gloom;
But with calm brow and steady brow
He robes him for the tomb.

In the long night, the still night,
He kneels upon the sod;
And the brutal guards withhold
E'en the solemn Word of God!
In the long night, the still night,
He walks where Christ hath trod.

'Neath the blue morn, the sunny morn,
He dies upon the tree;
And he mourns that he can lose
But one life for Liberty;
And in the blue morn, the sunny morn,
His spirit-wings are free.

But his last words, his message-words,
They burn, lest friendly eye
Should read how proud and calm
A patriot could die,
With his last words, his dying words,
A soldier's battle-cry.

From the Fame-leaf and Angel-leaf,
From monument and urn,
The sad of earth, the glad of heaven,
His tragic fate shall learn;
And on Fame-leaf and Angel-leaf
The name of HALE shall burn.

HASTE NOT! REST NOT!

The poem here quoted, *Haste Not! Rest Not!* was written by the great dramatist Johann W. von Goethe, who is known throughout the English-speaking world principally through the fame and popularity of the opera *Faust*.

WITHOUT haste! without rest!
Bind the motto to thy breast;
Bear it with thee as a spell;
Storm or sunshine, guard it well!
Heed not flowers that round thee bloom,
Bear it onward to the tomb.

Haste not! Let no thoughtless deed
Mar for aye the spirit's speed!
Ponder well, and know the right,
Onward then, with all thy might!
Haste not! years can ne'er atone
For one reckless action done.

Rest not! Life is sweeping by,
Go and dare, before you die;
Something mighty and sublime
Leave behind to conquer time!
Glorious 'tis to live for aye,
When these forms have passed away.

Haste not! rest not! calmly wait;
Meekly bear the storms of fate!
Duty be thy polar guide;—
Do the right, whate'er betide!
Haste not! rest not! conflicts past,
God shall crown thy work at last.

THE HEATHEN CHINEE

This humorous poem by Bret Harte deals with a phase in the lives of settlers in the great western portion of our continent.

WHICH I wish to remark—
And my language is plain—
That for ways that are dark,
And for tricks that are vain,
The heathen Chinee is peculiar,
Which the same I would rise to explain.

Ah Sin was his name,
And I shall not deny
In regard to the same
What that name might imply;
But his smile it was pensive and childlike,
As I frequent remarked to Bill Nye.

It was August the third,
And quite soft was the skies,
Which it might be inferred
That Ah Sin was likewise;
Yet he played it that day upon William
And me in a way I despise.

Which we had a small game,
And Ah Sin took a hand;
It was euchre—the same
He did not understand;
But he smiled as he sat by the table
With the smile that was childlike and bland.

Yet the cards they were stocked

In a way that I grieve,
And my feelings were shocked
At the state of Nye's sleeve,
Which was stuffed full of aces and bowers,
And the same with intent to deceive.

But the hands that were played
By that heathen Chinese,
And the points that he made
Were quite frightful to see,
Till at last he put down a right bower,
Which the same Nye had dealt unto me.

Then I looked up at Nye,
And he gazed upon me;
And he rose with a sigh,
And said: "Can this be?
We are ruined by Chinese cheap labor";
And he went for that heathen Chinese.

In the scene that ensued
I did not take a hand,
But the floor it was strewed,
Like the leaves on the strand,
With the cards that Ah Sin had been hiding
In the game "he did not understand."

In his sleeves, which were long,
He had twenty-four jacks,
Which was coming it strong,
Yet I state but the facts;
And we found on his nails, which were taper,
What is frequent in tapers—that's wax.

Which is why I remark—
And my language is plain—
That for ways that are dark,
And for tricks that are vain,
The heathen Chinese is peculiar,
Which the same I am free to maintain.

MY HEART'S IN THE HIGHLANDS

We have many poems by the Scottish national poet Robert Burns in our Book of Poetry, but few of them are more widely known and loved than *My Heart's in the Highlands*.

My heart's in the Highlands, my heart is not here;

My heart's in the Highlands a-chasing the deer;

Chasing the wild deer, and following the roe,
My heart's in the Highlands, wherever I go.

Farewell to the Highlands, farewell to the North,

The birthplace of valor, the country of worth;
Wherever I wander, wherever I rove,
The hills of the Highlands forever I love.

Farewell to the mountains high covered with snow;

Farewell to the straths and the green valleys below;

Farewell to the forests and wild-hanging woods;

Farewell to the torrents and loud-pouring floods.

My heart's in the Highlands, my heart is not here;

My heart's in the Highlands a-chasing the deer;

Chasing the wild deer, and following the roe,
My heart's in the Highlands, wherever I go.

EVENING HYMN

John Keble was an English clergyman and he wrote many beautiful poems. Among them is the *Evening Hymn*, which is sung in Protestant churches all over the world.

SUN of my soul, thou Saviour dear,
It is not night if thou be near;
Oh, may no earth-born cloud arise
To hide thee from thy servant's eyes.

When the soft dews of kindly sleep
My weary eyelids gently steep,
Be my last thought, how sweet to rest
Forever on my Saviour's breast.

Abide with me from morn till eve,
For without thee I cannot live;
Abide with me when night is nigh,
For without thee I dare not die.

If some poor wandering child of thine
Has spurned to-day the Voice divine,
Now, Lord, the gracious work begin:
Let him no more lie down in sin.

Watch by the sick; enrich the poor
With blessings from thy boundless store;
Be every mourner's sleep to-night
Like infant's slumbers, pure and light.

Come near and bless us when we wake,
Ere through the world our way we take,
Till in the ocean of thy love
We lose ourselves in heaven above.

CROSSING THE BAR

After Browning's *Prospice*, *The Crossing of the Bar*, by Alfred Tennyson, is the noblest death-song ever written. It is interesting to compare the differing emotions with which great men have faced the mystery of death, as shown forth in such poems as these and Robert Louis Stevenson's *Epitaph*.

SUNSET and evening star,
And one clear call for me!
And may there be no moaning of the bar,
When I put out to sea,

But such a tide as moving seems asleep,
Too full for sound and foam,
When that which drew from out the bound-
less deep
Turns again home.

Twilight and evening bell,
And after that the dark!
And may there be no sadness of farewell,
When I embark.

For tho' from out our bourne of Time and Place
The flood may bear me far,
I hope to see my Pilot face to face
When I have crossed the bar.

THE CHILD'S WISH IN JUNE

If the author of these verses is not known to fame and if they are not of any real poetical merit, they at least convey a very pleasing sense of that delightfully lazy month of June. All work and no play, as we are told, makes Jack a dull boy, and even nature seems to take a rest in June. Midsummer is a good time for us all to do a little idling, to enjoy the bright sunshine, the sweet bird-song, and the lazy drone of the bees.

MOTHER, mother, the winds are at play;
Prithee, let me be idle to-day!
Look, dear mother, the flowers all lie
Languidly under the bright blue sky.

See how slowly the streamlet glides;
Look how the violet roguishly hides;
Even the butterfly rests on the rose,
And scarcely sips the sweets as he goes.

Poor Tray is asleep in the noonday sun,
And the flies go about him one by one;
And pussy sits near with a sleepy grace,
Without ever thinking of washing her face.

There flies a bird to a neighboring tree,
And very lazily flieth he;
And he sits and twitters a gentle note,
That scarcely ruffles his little throat.

You bid me be busy; but, mother, hear
How the humdrum grasshopper soundeth near;
And the soft west wind is so light in its play,
It scarcely moves a leaf on the spray.

I wish, oh, I wish I were yonder cloud,
That sails about its misty shroud;
Books and work I no more should see,
But I'd come and float, dear mother, o'er thee!

A BIRTHDAY

This little poem by Christina Rossetti has been set to music by several composers. As you read it you are thrilled by its note of ecstasy. What is more purely joyous than a song-bird, a laden apple-tree, a rainbow shell-afloat? Yet the heart celebrates more fully than any of these at the coming of love. It erects a throne, hangs it gorgeously, carves it richly with the pure white dove, with the gaudy peacock. The climax of feeling in the last line of both verses is finely reached and held.

MY heart is like a singing bird
Whose nest is in a watered shoot;
My heart is like an apple-tree
Whose boughs are bent with thick-set fruit;
My heart is like a rainbow shell
That paddles in a halcyon sea;
My heart is gladder than all these,
Because my love is come to me.

Raise me a dais of silk and down;
Hang it with vair and purple dyes;
Carve it in doves and pomegranates,
And peacocks with a hundred eyes;
Work it in gold and silver grapes,
In leaves and silver fleurs-de-lys;
Because the birthday of my life
Is come, my love is come to me.

A LIFE ON THE OCEAN WAVE

Many of us have heard this fine rollicking song. It expresses the longing for a "life on the ocean wave" of the born sailor who is never content on the "dull unchanging shore." Through fair weather and through foul he craves the freedom of the seas.

A LIFE on the ocean wave,
A home on the rolling deep,
Where the scattered waters rave,
And the winds their revels keep!

Like an eagle caged, I pine
On this dull, unchanging shore:
Oh! give me the flashing brine,
The spray and the tempest's roar!

Once more on the deck I stand
Of my own swift-gliding craft:
Set sail! farewell to the land!
The gale follows fair abaft.
We shoot through the sparkling foam
Like an ocean-bird set free;—
Like the ocean-bird, our home
We'll find far out on the sea.

The land is no longer in view,
The clouds have begun to frown;
But with a stout vessel and crew,
We'll say, Let the storm come down!
And the song of our hearts shall be,
While the winds and the waters rave,
A home on the rolling sea!
A life on the ocean wave!

BETTER THINGS

Several of George Macdonald's poems have already appeared in our pages, and we always find him praising the virtue of humility, the delight in simple things. In the following verses he celebrates those "better things" which many of us are apt foolishly to despise in our search after the vanities of life. In every line the choice and the contrast are shown.

BBETTER to smell the violet cool, than sip
the glowing wine:
Better to hark a hidden brook, than watch a
diamond shine.

Better the love of a gentle heart, than beauty's
favour proud;
Better the rose's living seed, than roses in a
crowd.

Better to love in loneliness, than to bask in
love all day;
Better the fountain in the heart, than the
fountain by the way.

Better be fed by a mother's hand, than eat
alone at will;
Better to trust in God, than say: "My goods
my storehouse fill."

Better to be a little wise, than in knowledge
to abound;
Better to teach a child, than toil to fill perfec-
tion's round.

Better to sit at a master's feet, than thrill a
listening State;
Better suspect that thou art proud, than be
sure that thou art great.

Better to walk the real unseen, than watch the
hour's event;
Better the "Well done!" at the last, than
the air with shouting rent.

Better to have a quiet grief, than a hurrying
delight;
Better the twilight of the dawn, than the
noonday burning bright.

Better a death when work is done, than earth's
most favoured birth;
Better a child in God's great house, than the
king of all the earth.

MARCH

What we mean by "natural" poetry is very clearly illustrated in the following verses by Wordsworth, when we compare their direct and simple pictures of natural objects with the artificial grandeur of Milton's lines On May Morning.

THE cock is crowing,
The stream is flowing,
The small birds twitter,
The lake doth glitter,
The green field sleeps in the sun;
The oldest and youngest
Are at work with the strongest;
The cattle are grazing,
Their heads never raising,
There are forty feeding like one!
Like an army defeated
The snow hath retreated,
And now doth fare ill
On the top of the bare hill;
The plough-boy is whooping anon, anon.
There's joy in the mountains;
There's life in the fountains;
Small clouds are sailing,
Blue sky prevailing;
The rain is over and gone!

THE FISHERMAN

Barry Cornwall in these lines is taking, perhaps, too gloomy a view of the fisherman's lonely life; for, after all, to be "companion of the sea and silent air" is not to live entirely in vain.

A PERILOUS life, and sad as life may be,
Hath the lone fisher, on the lonely sea,
O'er the wild waters labouring far from home,
For some bleak pittance e'er compelled to roam:
Few hearts to cheer him through his dangerous life,
And none to aid him in the stormy strife:
Companion of the sea and silent air,
The lonely fisher thus must ever fare:
Without the comfort, hope—with scarce a friend,
He looks through life and only sees its end!

THE PARROT

This is a true story which Thomas Campbell, the famous Scottish poet, put into verse; and it proves what we have said so often, that in the events of ordinary life there is all the tragedy, the pathos and the humor of the best poetry.

A PARROT, from the Spanish main,
Full young and early caged came o'er,
With bright wings, to the bleak domain
Of Mulla's shore.
To spicy groves where he had won
His plumage of resplendent hue,
His native fruits, and skies, and sun,
He bade adieu.
For these he changed the smoke of turf,
A heathery land and misty sky,
And turn'd on rocks and raging surf
His golden eye.
But petted in our climate cold,
He lived and chatter'd many a day:
Until with age, from green and gold
His wings grew grey.
At last when blind, and seeming dumb,
He scolded, laugh'd, and spoke no more,
A Spanish stranger chanced to come
To Mulla's shore;
He hail'd the bird in Spanish speech,
The bird in Spanish speech replied;
Flapp'd round the cage with joyous screech,
Dropt down, and died.

THE USEFUL PLOUGH

This is a charming old English song, whose writer is unknown, but who must have surely known and loved the rural life.

A COUNTRY life is sweet!
In moderate cold and heat,
To walk in the air, how pleasant and fair,
In every field of wheat,
The fairest of flowers adorning the bowers,
And every meadow's brow;
So that I say, no courtier may
Compare with them who clothe in grey,
And follow the useful plough.
They rise with the morning lark,
And labour till almost dark;
Then folding their sheep, they hasten to sleep;
While every pleasant park
Next morning is ringing with birds that are singing,
On each green, tender bough.
With what content and merriment,
Their days are spent, whose minds are bent
To follow the useful plough!

CASABIANCA

This is perhaps the best known of the many poems of Mrs. Hemans. It is the true story of the death of a boy aged about thirteen years. His father, who was admiral of the Orient, in the battle of the Nile, bade his young son remain at his post. The ship took fire, the admiral was killed, and all left except the noble boy, who would not leave his post without his father's permission. The flames reached the powder, the vessel exploded, and with it perished Casabianca.

THE boy stood on the burning deck
Whence all but he had fled;
The flame that lit the battle's wreck
Shone round him o'er the dead.
Yet beautiful and bright he stood,
As born to rule the storm;
A creature of heroic blood,
A proud, though childlike form.
The flames roll'd on—he would not go
Without his father's word;
That father, faint in death below,
His voice no longer heard.
He call'd aloud, "Say, father, say,
If yet my task is done!"
He knew not that the chieftain lay
Unconscious of his son.
"Speak, father," once again he cried,
"If I may yet be gone!"
And but the booming shots replied,
And fast the flames roll'd on.
Upon his brow he felt their breath,
And in his waving hair,
And look'd from that lone post of death
In still yet brave despair.
And shouted but once more aloud,
"My father, must I stay?"
While o'er him fast, through sail and shroud,
The wreathing fires made way.
They wrapt the ship in splendour wild,
They caught the flag on high,
And stream'd above the gallant child
Like banners in the sky.
There came a burst of thunder-sound—
The boy—oh, where was he?
Ask of the winds that far around
With fragments strew'd the sea!
With mast, and helm, and pennon fair,
That well had borne their part—
But the noblest thing that perish'd there
Was that young, faithful heart!

LITTLE VERSES FOR VERY LITTLE PEOPLE

THERE was a
man, and
he went mad,
And he jumped
into a biscuit
bag;



The biscuit bag
it was so full,
So he jumped
into a roaring
buli;



The roaring buli it
was so fat,
So he jumped into a
gentleman's hat:



The gentleman's hat it was
so fine,
So he jumped into a bottle
of wine;



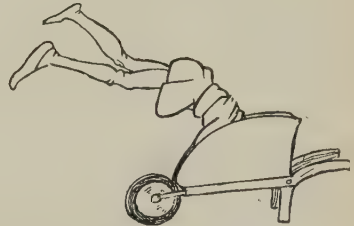
The bottle of wine it
was so dear,
So he jumped into a
barrel of beer;



The barrel of beer it was
so thick,
So he jumped into a walk-
ing-stick;



The walking-stick it was
so narrow,
So he jumped into a
wheelbarrow;



The wheelbarrow began to crack,
So he jumped into a haystack;



The haystack
began to
blaze,
So he did
nothing but
cough and
sneeze!

JACK SPRAT could eat no fat,
His wife could eat no lean;
So it came to pass, between them both,
They licked the platter clean.

Jack ate all the lean,
Joan ate all the fat;
The bone they picked it clean,
Then gave it to the cat.

Jack Sprat was wheeling
His wife by the ditch;
The barrow turned over,
And in she did pitch.

Says Jack: "She'll be drowned,"
But Joan did reply:
"I don't think I shall,
For the ditch is quite dry."

Joan Sprat went to brewing
A barrel of ale,
She put in some hops
That it might not turn stale.

But as for the malt,
She forgot to put that;
"This is brave, sober liquor,"
Said little Jack Sprat.

FOR every evil under the sun,
There is a remedy, or there is none.
If there be one, try and find it;
If there be none, never mind it.

TELL tale tit,
Your tongue shall be slit;
And all the dogs in the town
Shall have a little bit.

CROSS patch,
Draw the latch,
Sit by the fire and spin;
Take a cup,
And drink it up,
Then call your neighbours in.

A SWARM of bees in May
Is worth a load of hay;
A swarm of bees in June
Is worth a silver spoon;
A swarm of bees in July
Is not worth a fly.



CURLY LOCKS



Cur - ly locks! cur - ly locks! wilt thou be mine? Thou shalt not wash
dish - es, nor yet feed the swine; But sit on a cush-ion, and
sew a fine seam, And feed up-on straw-ber-ries, sug-ar, and cream.

THERE was a little Rabbit sprig,
Which, being little, was not big;
He always walked upon his feet,
And never fasted when he eat.
When from a place he ran away,
He never at that place did stay;

And when he ran, as I am told,
He ne'er stood still for young or old;
Tho' ne'er instructed by a cat,
He knew a mouse was not a rat.
One day, as I am certified,
He took a whim and fairly died;
And, as I'm told by men of sense,
He never has been walking since.

BAT, bat, come under my hat,
And I'll give you a slice of bacon;
And when I bake,
I'll give you a cake,
If I am not mistaken.

BIRCH and green holly, boys,
Birch and green holly,
If you get beaten, boys,
'Twill be your own folly.

STRAIGHT is the path of duty,
Curved is the line of beauty;
Follow the first and thou shalt see
Ever the second following thee.



The crabapple and what it has become.

HOW PLANTS CAME TO BE

WE look out on the world around us, with its myriads of flowering plants; its pine forests and groves of coco-palms; its club-mosses, ferns and horsetails; its mosses and liverworts; its toadstools, molds and microbes; its seaweeds and simple single-celled diatoms; and its quaint double-plants, the lichens; and we are bound to ask how the world of things has come to be as it is.

The first part of the answer we have already had. Most botanists think that the first plants were free-swimmers in a universal, or almost universal, sea.

According to this theory, fixed seaweeds arose in shallow water; and from the seaweeds, more or less directly, as the dry land rose out of the water, there emerged land plants. From simple forms there also arose the ancient ferns, with mosses on a side-track; and from the great fern alliance came conifers and cycads, and eventually the ordinary flowering plants which gladden our eyes to-day.

There has been a gradual ascent. The simpler plants gave rise to the more complex. This is what is meant by saying that the plant world of to-day has *evolved* from a simpler plant world of the day before yesterday, so to speak; that, again, from a simpler vegetation of a million years ago; and so

CONTINUED FROM 1281



on backward and backward, till we come to the mist of life's beginnings, of which we know almost nothing.

But on the top of the first question comes a second. If the present-day flora developed from an older and simpler flora, how did it do it? Everyone knows the crabapple, with its very beautiful flowers and its very sour fruit. Now, it seems that this wild apple is the ancestor of all the cultivated apples of the orchard, just as the wild rock-dove is the ancestor of all the domesticated pigeons in the dovecote. It is not that good soil and comfortable shelter directly changed the crabapple into a golden pippin; it is rather that the crabapple, under cultivation, has produced promising new departures, or novelties, that man has fostered and established as races of cultivated apples. Man did not change a wolf into a domestic dog in some magical way by taming and teaching; it is probable that he took advantage of docile and kindly wolf cubs to which more or less captive wolves had given birth.

But, to be honest, we must confess that we do not know how our ancestors were able to domesticate so many useful animals, or to cultivate so many useful plants. The gleam of light we have on these achievements is just this—that living creatures are very

changeable, not so much in themselves as in their offspring. These new departures, or novelties, or freaks, or sports, or variations—what a lot of names they have!—are the raw material out of which have been sifted new races. In wild nature the sifting is what we call the *natural selection*, because nature does the selecting, or sifting; but when man came upon the stage, he became the maker and holder of the sieve.

THE BIG FAMILY OF THE WILD CABBAGE OF THE SEASHORE

The wild cabbage of the seashore varied, and he gave food and shelter to those sports that seemed to him promising. More sports followed, and he sifted again. So we have cabbages and cauliflowers, Brussels sprouts and curly greens, and more besides—all developed from the wild cabbage, through variation and selection.

In some cases, like the apple, the cabbage and the wheat, we are reasonably certain of the wild ancestors of our cultivated plants; but in most cases the origin and history of our garden flowers, fruits and vegetables are not clear. We may know in a general way where they came from, but we cannot tell the precise story. It was not till lately that the wild wheat was discovered. Most of the important cultivations began very long ago, and the clue has been lost.

But this does not matter very much as far as concerns the general question of how things came to be as they are. For the process of change continues briskly still, and we have only to visit a flower show to see how many novelties are always being produced.

THE RACE OF ORANGE TREES WITH SEEDLESS FRUITS

The orange-growers and marmalade-makers decide that it would be a good thing to have a seedless orange, and after a few years of patient care they have what they want. How is it done? Those orange trees which showed a tendency to produce fruit with few seeds were selected; cuttings were taken which grew into trees, and again there was a sifting out of those which showed fewest seeds in their fruit. The process was then continued until there arose a race of orange trees with delicious seedless fruits. In wild nature this race would immediately perish just because there are no seeds; but man propagates the orange trees by cuttings, and under his shield the race

prosper. In other cases, like wheat, man separates the seed of individual good plants and cultivates these till he has large numbers; or, again, he may dust the pollen from one good plant on to the pistil of another which is equally promising in another direction.

One of the best-known plant-breeders of modern times is Luther Burbank, of California. He would be the last to allow the word magician to be used about him, for what he always does, like other practical evolutionists, is simply to take advantage of promising novelties that nature puts into his hand.

Of course, there must be a keen eye to detect their first appearance. The novelty of promise is bred from, and sheltered from the possibility of being crossed by commonplace relatives; similar forms are paired together, so that the new race becomes *inbred*, as we say; "rogues" and "throw-backs" and other undesirables are promptly got rid of, and so a new race is started.

THE FREAK OF NATURE THAT GAVE US THE STONELESS PLUM

One of Mr. Burbank's successes has been the rearing of a stoneless plum. In the centre of the juicy fruit there is, as usual, a kernel, or seed, but it is naked. By some freak, which naturalists call a *mutation*, trees showed fruits in which the hard stone was suppressed, just as sometimes cats may have kittens without tails, or cows may have calves without horns; and Mr. Burbank encouraged this new departure. *He fixed a freak.*

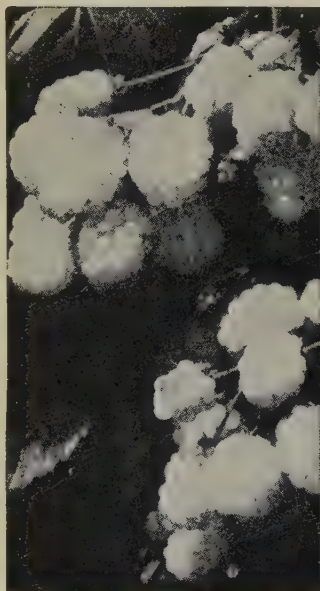
Another success was a cross between the bramble and the raspberry, which yielded the Phenomenal berry. This is so fixed and stable that it breeds true from seed, whereas some of the bramble-crosses can be propagated only by cuttings and layers. Another good thing was the Primus berry, a cross between the Californian dewberry and the Siberian raspberry; it is a good new creation.

The work of Mr. Burbank, like that of many other successful plant-breeders, has consisted in setting apart and fostering promising novelties which appeared in nature's fountain of change, or else in crossing one promising plant with another and then sifting the results of the crossing. It sounds simple, but Professor de Vries, the Dutch botanist who has particularly studied these changes, calls attention to the amount of work that was

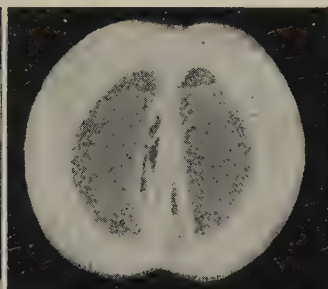
TRANSFORMATIONS OF THE PLANT WORLD



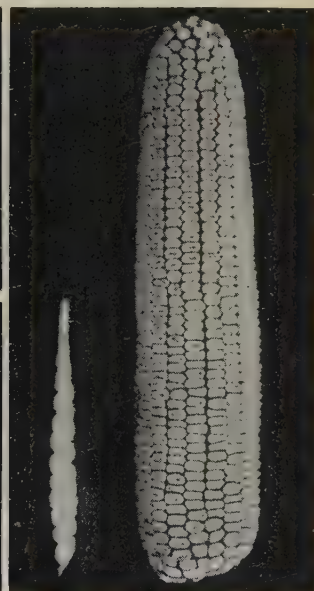
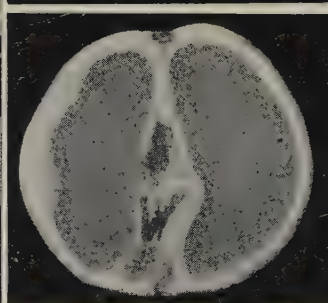
Lamarck's Evening Primrose and three of the new species Professor Hugo de Vries obtained from it.



The white blackberries.



The changed orange peel.



Wild and cultivated corn.



Wild cabbage and the Brussels sprout developed from it.



The wild carrot and the cultivated carrot developed from it.

often necessary to produce a new race. Forty thousand blackberry and raspberry hybrids were produced and grown until the fruit matured, and then from all these a single variety was chosen as best. It is now known under the name of Paradox.

Professor de Vries tells us what happened to the others; it is very interesting:

All the others were uprooted with their crop of ripening berries, heaped up into a pile twelve feet wide, fourteen feet high, and twenty-two feet long, and burned. Nothing remains of that expensive and lengthy experiment, except the one parent-plant of the new variety.

Similar selections have produced the famous plums, the brambles and the blackberries, the Shasta daisy, the peach-almond, the improved blueberries, the hybrid lilies, and the many other valuable fruits and garden flowers that have made the fame of Burbank.

Of course, it must be understood that Luther Burbank is only one of the many experimenting breeders who are working hand in hand with nature in establishing *new creations*. The experimenter must have eyes that are quick to catch the slightest differences and a nose that is sensitive in distinguishing odors. He needs, too, unflinching patience and courage to meet disappointment and try again.

THE EVENING-PRIMROSE AND ITS WONDERFUL OFFSPRING

What is true of plants under cultivation is true also of plants in natural conditions. However, it must be admitted that some plants are very stable, as if they had attained to a finely balanced constitution. It is very likely that Professor de Vries is right in his suggestion that in the history of plants as a whole, and in the history of particular kinds of plants, there are periods of changefulness which alternate with periods of stability. It is very probable, for instance, that a marked change of climate might, in many plants at once, "pull the trigger" of the changefulness which is part of the secret of every living creature.

In a potato-field near Amsterdam Professor de Vries found an escaped stock of Lamarck's Evening-primrose. The escaped stock was remarkably variable. Almost all its parts varied as if swayed by a restless internal tide.

From this stock De Vries obtained half a dozen or more distinct varieties—*new species in the making*. What was striking about many of the novelties was their separateness from the parent forms—as

if they had leaped from one kind to another suddenly; and a second striking feature was that the new departures bred true; that is to say, they produced offspring like themselves. So De Vries was led to the very important conclusion that "new varieties are produced from existing forms by sudden leaps."

PLANTS THAT CHANGED FROM THE LIKENESS OF THEIR PARENTS

Darwin thought that the most important changes from generation to generation in living creatures were small changes—a little more of this and a little less of that. From a continuous crop of these little changes, which might be called *fluctuations*, a big change may be brought about in a long time, if the little changes continue from generation to generation and if the sifting process continues.

But the conclusion of De Vries is rather that changes of a striking kind sometimes come about all at once. Some of the new evening-primroses which the Dutch botanist reared from his changeful stock were very different from their parents. Some had few branches instead of many; some had small flowers instead of large; some had quite different leaves. It is certain that considerable changes may suddenly crop up from generation to generation, and it is likely that many of our cultivated plants arose in this sudden way. They may *leap* as well as creep, for there is no longer any doubt that novel characters may suddenly appear in great perfection and not be linked to their parents by halfway stages.

THE CURIOUS THING THAT HAPPENED IN THE APOTHECARY'S GARDEN

Another striking feature is that when a novelty of this sort comes, it usually comes to stay. It takes grip and reappears generation after generation. In other words, it is hereditary. Thus, the oak-leaved variety of the Greater Celandine seems to have appeared suddenly in 1590 in an apothecary's garden in Heidelberg, and it has been breeding true ever since. Its main peculiarity is in having much-cut-up leaves, and this peculiarity is constant, whether the plant is multiplied by cuttings or by seeds. Weeping willows and copper beeches illustrate the same kind of sudden change, and the abrupt origin of the new is occasionally seen in the simplest plants of all—the bacteria.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 1469.

THINGS TO MAKE AND THINGS TO DO



MAKING A TOY TO MEASURE THE WIND

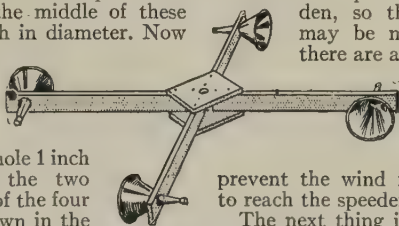
ANY boy can make an interesting toy that will enable him to appreciate the force of the wind, and even, to some extent, to tell the speed of the wind. The first things required are two pieces of wood 3 inches square and $\frac{1}{2}$ inch thick. Through the middle of these make a hole about $\frac{3}{8}$ inch in diameter. Now take four pieces of wood 15 inches long, 2 inches wide, and $\frac{1}{2}$ inch thick, as seen in picture 3. Near one end of each of these pieces make a round hole 1 inch in diameter. Now nail the two square pieces to the edges of the four long pieces in position shown in the picture 1, keeping the inside ends of the long pieces

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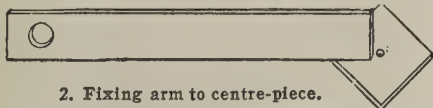
blow into the mouth of each in turn, as the arms spin around. The funnels should be pushed into place.

Next we require a post erected in the garden, so that the revolving speeder may be mounted on top of it. If there are any wooden clothes-posts in the garden, it may be mounted on top of one of them. Choose a post as far as possible from any walls that would prevent the wind from having a free course to reach the speeder.

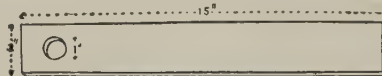
The next thing is to get a washer—that is a small flat ring of iron with a hole of, say, $\frac{1}{2}$ -inch size.



1. Speeder ready for mounting.



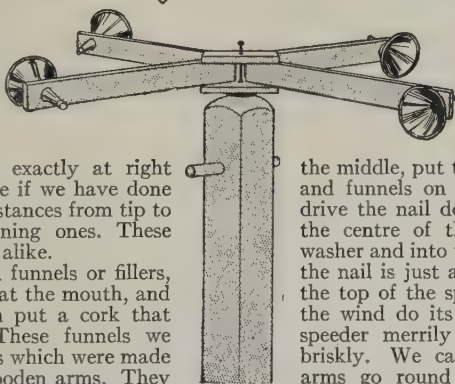
2. Fixing arm to centre-piece.



3. One of the four arms.

a little distance away from the hole in the middle of the square pieces. Picture 2 shows the first stage in this operation. Care must be taken to make the four pieces exactly at right angles, and we may see if we have done so by measuring the distances from tip to tip of any two adjoining ones. These distances should be all alike.

We now get four tin funnels or fillers, 4 or 6 inches diameter at the mouth, and into the spout of each put a cork that will close the end. These funnels we place in the round holes which were made near the tips of the wooden arms. They must be put in all from the sides, as seen in picture 1, so that the wind will



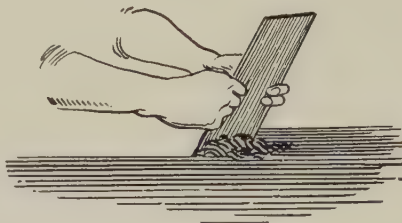
4. Speeder ready for work.

Washers are very cheap. We shall also want a round wire nail, not less than 5 inches long. Now put the washer on top of the wooden post, right in the middle, put the speeder with its arms and funnels on top of the washer, and drive the nail down through the hole in the centre of the speeder through the washer and into the post until the head of the nail is just about half an inch above the top of the speeder. Now we can let the wind do its work. It will send the speeder merrily around when it blows briskly. We can count how often the arms go round in a minute, and the different colors of the funnel will enable us to count the revolutions easily.

HOW YOU MAY REFINISH THAT PIECE OF FURNITURE

PERHAPS you now have in your room a piece of valuable furniture the varnished surface of which has become scratched or otherwise unsightly. If neither the color nor the grain of the wood shows to advantage, you may well decide to refinish it. In case the grain of the wood is truly beautiful, it would be a great mistake for you to cover it with paint or other similar finish, or even to use too dark a stain. In most cases oil and wax can give your piece of furniture a finish which will prove most satisfactory both in appearance and for use.

Prepared varnish-remover may be used to loosen the old varnish, which is then easily wiped off with a piece of cotton cloth, but it is often better to scrape and then sandpaper the old finish from the piece of furniture before the new finish is applied. This scraping is usually done most easily with a steel scraper, but pieces of window glass will be found entirely satisfactory if you do not have a metal scraper. However, if you plan to do much refinishing, you should get one or more steel scrapers, which may be bought in any hardware store for a small amount.



How to use the scraper.

In either case, scrape with the grain of the wood but not across it. Hold the steel or glass scraper firmly at an angle of about 45 degrees, with the top inclined away from you, as shown. It should be pushed steadily away from you to secure the best results. Ordinarily this can be done more easily by pressing the thumbs back of the scraper and holding it at the desired angle with the fingers placed in front. If the steel scraper fails to remove the varnish after a time, it is due to the loss of its cutting edges. These are easily renewed by first filing the edges perfectly straight and then turning back new burrs, or cutting edges, with another steel surface (the shank of a screwdriver will answer the purpose). Whenever this difficulty arises in scraping varnish with the edges of a piece of glass it is necessary to secure a new piece.

Sometimes it is not possible to use these scrapers in removing the old varnish from irregular parts or from corners. However, it is important to have

every trace of the old removed before the new finish is applied. Of course prepared varnish-remover may be used as suggested, but ammonia (full strength) may also be applied for this purpose. This will quickly loosen the old varnish, which is easily removed with cheesecloth or any soft rag. Be careful not to allow the ammonia to remain on the surface longer than is needed, as the fumes may stain the wood after the varnish has been loosened. If by any chance this should happen, you may bleach the stained parts to their original color by applying a solution of oxalic acid, which is made by dissolving 2 tablespoonfuls in about 1 pint of hot water. In case this is used, its action should be watched with care in order that the stained parts may not be bleached too much.

After all traces of the old varnish have been removed, the surfaces should be finished smooth with fine or old sandpaper. The piece of furniture is now ready to be oiled. Raw or unboiled linseed oil should be used, but if this is not thinned with a little ($\frac{1}{3}$ to $\frac{1}{4}$) benzene, it will tend to become gummy when applied.

The mixture of raw linseed oil and benzene may be applied either with a brush or with a piece of cloth. It should then be allowed to stand for several hours until the wood has absorbed as much of the oil as possible. If convenient, this should be applied one day and allowed to stand overnight or even longer. Otherwise it will be necessary to repeat this process until the desired body of finish is obtained. Regardless of the number of hours the mixture is allowed to stand on the piece of furniture, all remaining traces of oil (sweat) should be wiped off with a soft rag (woolen is preferable). Then rub the surfaces hard with a piece of felt to polish it. You will be better satisfied with the finish if you repeat this oiling process several times, although it is not necessary. The final polish is given by applying one or more coats of floor or furniture wax and rubbing each coat as was done with the oil. If you have followed these directions carefully, you have a beautiful piece of furniture.

WHAT THE JESTER DID WITH THE ROPE

THE jester in his prison, as described in the problem on page 1286, looked at his precious piece of rope, and wished it were elastic, so that he could stretch it and make it long enough for him to reach the ground with it. Fortunately the rope was stoutly made, though it was too short.

While fingering it the jester saw how thick and strong the strands of the rope were, so he began

unwinding them. Then he thought, "I will untwist the rope and see if it is possible to join the separate strands in such a way as to make a long rope." This he set about doing, and when the untwisted strands lay on the prison floor, he took up the ends and spliced them together.

Soon he was able to let himself down and get safely away.

HOW THE MILLER ARRANGED THE SACKS

ON page 1286 is the problem of the miller and the sacks. This is the answer to it.

The way to arrange the sacks is as follows: 2, 78, 156, 39, 4. Here each pair when multiplied by its single neighbor makes the number in the

middle, and only five of the sacks need be moved. There are only three other ways in which the sacks could have been rearranged; but any one of these would have demanded that more than five sacks should be moved.

PICTURE-FRAMES THAT BOYS CAN MAKE

IT is not a difficult matter to frame pictures, but the work requires care and accuracy. The wood of a picture-frame is called the picture-frame molding. This molding is sold in lengths of 6 feet or longer.

If you look at the end of a piece of picture-frame molding, you will find that, whatever may be the shape of the ornamental surface which will be visible when the picture is framed, there is at the back of it what is called a rabbet, but what is actually a groove cut in the edge all along one side. When the picture is framed this groove is put on the inside next to the picture, so that it forms a regular depression all round in which the picture and the glass lie. Picture 1 shows a piece of molding cut at the ends to the shape required for making a frame, and illustrates the rabbet.

In an ordinary picture-frame the molding is in four pieces, the top and bottom pieces being exactly alike in length, and the two sides being exactly alike in length. The ends of the different pieces are not cut square across, but are cut to an angle of 45 degrees. Although most people know what an angle of 45 degrees means, it may be well to explain it. The corner of a square is a right angle. If from one corner of a square to the opposite corner we draw a straight line, we divide the right angle into two equal parts, and each half is an angle of 45 degrees. By following the instructions given here, it will be easy to draw an angle of 45 degrees when you wish to cut the picture molding into the necessary lengths. The carpenter who wishes to mark wood to an angle uses a bevel, such as is seen in picture 2.

A neat picture-frame depends upon the neatness of the mitres, or corners, and the ends must be sawed very accurately and put together very exactly. If the molding is a plain one, with a surface that is flat or nearly flat, it may be quite possible to cut the corners to the proper angles; but if the molding has an irregular or ornamental surface, then this may not be possible without using an instrument which is called a mitre-block, such as is shown in picture 3.

A plain mitre-block consists of two pieces of wood nailed together, both of the same length, but the lower one a little wider than the upper one. The sizes are unimportant. Through the narrowest piece saw-cuts are made to guide the saw, as shown in the picture. Two of these are at an angle of 45 degrees, sloping opposite ways. The middle one is square across, for square cutting. The molding

rests on the lower part of the block, and is pressed against the edge of the upper narrower piece while it is being sawed. A mitre-block may be purchased at a tool-shop, or one may be made. It should be made of hard wood, such as beech, oak, or the like.

The sizes for the four pieces of molding are, of course, taken from the picture itself. The inside, or rabbet, edge of the molding is about $\frac{1}{4}$ inch shorter than the side of the picture where it is to touch. This allows the extreme edge of the picture to go into the rabbet. This length of the inside edge of a piece of molding is called the sight measurement because upon this depends the size of the picture that will show within the frame.

The mitres when sawed are not accurate enough to fit each other as perfectly as is necessary for neat appearance, and therefore a plane should be used after a saw. To do this properly, another special appliance, called a mitre-shoot, is required. Picture 4 shows how it is used. The plane is slid on its side, and the molding bears against a piece of wood put on at an angle of 45 degrees. This insures the mitred ends being planed to the correct angle, and if the plane-iron is set carefully,

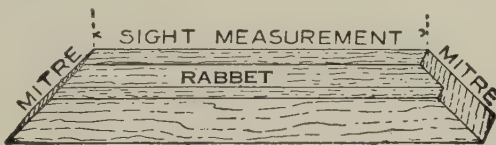
it will cut square in the vertical direction. Without a mitre-shoot it is quite possible to plane or pare the mitres accurately, but it is not easy, and there is risk of injury to the edges of the molding. Plain molding that can

be turned over on its face on the mitre-shoot may have both its ends planed in the position shown in picture 4 on the next page, but generally it is necessary to turn the shoot round and work the plane with the left hand for one end. Mitre-cutting machines are very useful, but are regarded as too expensive for anyone who is not constantly framing pictures.

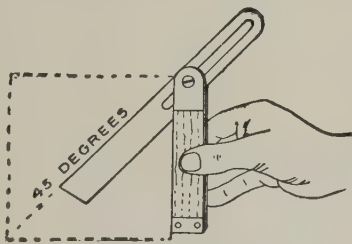
Frames are held together by glue and nails at their corners, and also by paper, which is generally

glued to the frame. (Read the following article on wood glue.) After the mitres are cut, the four pieces should be placed in position,

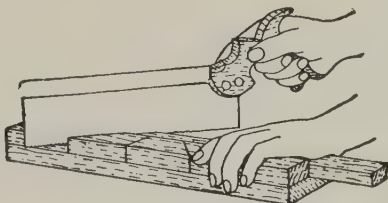
to be sure that all the corners fit properly. There are then two different ways in which the gluing and nailing may be done. Of course, if corner-clamps or an entire frame-clamp is to be used, that will simplify the work; but we will suppose the frame is to be put together without these appliances. The simplest, quickest and roughest way is shown in picture 5. One piece of molding is gripped in a vise tightly enough to resist the force of hammering the nails into its end, and then the glue is applied and the next piece of molding held



1. Picture-frame molding cut to shape.



2. Using the bevel.



3. Using the mitre-block.

in position and nailed to it. The best vise for the purpose is an iron one but a piece of wood or cardboard should always be put between the iron jaw and the outer edge of the molding in order not to injure the latter.

On the inner edge the vise-jaw grips in the rabbet where marks of the vise on the wood will not matter. Fine wire nails should be used, and holes bored for them with a bradawl through the first mitred piece, and slightly into the end grain of the second. As the hammering is likely to cause the first mitred piece to slip inward a little at the joint, the nailing should begin with the first piece too far out. A side and end of the frame are joined in this way, and then the other side and end similarly. After this the two remaining corners may be done without the vise, if preferred, but to avoid risk of injury to the joints already secured it is safest to continue with the vise.

The other way of putting a frame together is first to glue the parts and then clamp them together, leaving them for a few hours until the glue has set before putting in the nails. This is slow, and some means of clamping is necessary, but a neat result is more certain, for by the other method the parts are liable to shift out of exact position while the nails are being driven.

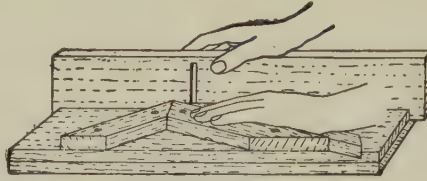
Without special clamps the simplest way to bind the frame together while the glue is setting is to make four blocks to fit the corners, and to tie string round the outside as shown in picture 6. A flat surface is cleared to lay the frame on; glue is applied to all the mitres; they are quickly placed together with the blocks outside, and then the string is tied round as tightly as possible. Sometimes it is not tied very tightly at first. The method of tightening shown in picture 6, however, is easy and satisfactory for ordinary work of

moderate size. A loop is formed at one end of the string, and the other end is pulled through this, so that it can be strained tightly simply by pulling. It is then necessary to secure the end of the string to prevent it from loosening again. This can be done by winding it a few times around nails in one of the corner-blocks as shown.

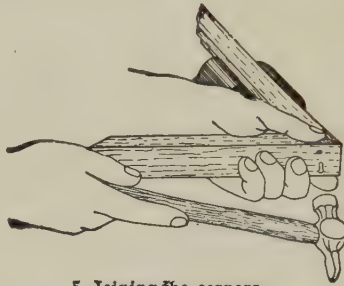
If glass is used it must fit easily into the rabbet. The picture is placed face down on the glass, and generally a sheet of clean brown paper is placed on the back of the picture. Then the backboard, which is a thin piece of wood of the same size as the glass, is put in and secured by driving fine wire nails horizontally into the molding, leaving their heads standing out a little way, so that they keep the backboard pressed against the picture-back. Brown paper is generally pasted either over the joints only, or over the entire backboard and frame.

Unmounted pictures—that is, pictures on thin paper not mounted on cardboard—are liable to become wrinkled, and will not lie evenly against the glass if they are put in dry. Therefore, the backs of such are always dampened, and allowed a few minutes in which to stretch before the backboard is put in. This should press firmly on the picture, and as the latter dries it becomes strained and always remains quite flat. The result is better.

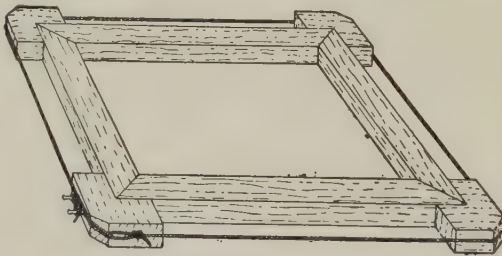
It is much easier to make a frame if metal corner-clamps are used. These hold the corners more securely than the wood blocks in picture 6 and the nails can be driven without waiting for the glue to dry. By the method shown in picture 5 there is no waiting, but it is not easy to nail the frame together accurately in that way. A very useful appliance is a combined mitre-block and corner-clamp. With this, and a fine saw, the corners can be fitted without the use of a plane or chisel.



4. Using the mitre-shoot.

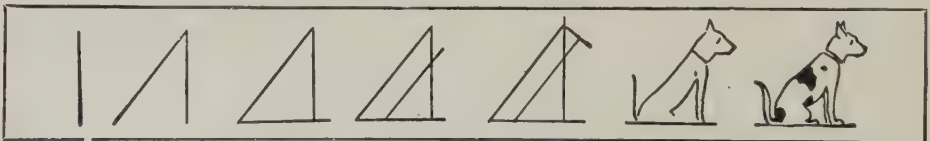


5. Joining the corners.



6. Binding the picture-frame.

A SIMPLE WAY TO DRAW A DOG



IF you want to draw a dog and you are not clever at drawing, this shows you how to make a splendid little dog by the aid of three straight

lines drawn faintly in pencil in the form of a triangle. When you have filled in the outline, the pencil lines, of course, should be rubbed out.

HOW TO CHOOSE A SUITABLE WOOD GLUE

THERE is a best or special kind of glue manufactured for every kind of gluing used in making furniture or other wood products. The glues that are adapted for gluing wood may conveniently be divided into five classes as follows:

1. Animal glues, which are made from the hides, hoofs, horns, bones and fleshings of animals, mostly cattle. These glues come in dry form and must be mixed with water and melted.

2. Casein glues, which are made from casein, lime and certain other chemical ingredients. They are commonly sold in prepared form, and require only the addition of water, but they may be mixed by the addition of the separate materials to the water.

3. Vegetable glues, which are made from starch, usually cassava starch, and sold in powdered form. They may be mixed cold with water and alkali, but heat is commonly used in preparing them.

4. Blood-albumin glues, which are made from soluble blood albumin, a product recovered from the blood of animals. These glues must be mixed from the separate ingredients just before use, since they deteriorate rapidly on standing.

5. Liquid glues, which are commonly made from the heads, skins, bones and swimming bladders of fish. Some liquid glues are made from animal glue and from other materials. They come in prepared form, ready for immediate use.

Vegetable glues are the cheapest, and usually range in price from about 7 to 11 cents a pound. Prepared casein glues may range in price from 12 to 24 cents; different grades of animal glue from 12 to 30 cents, and dried blood albumin, suitable for making glue, from 16 to 38 cents a pound.

Animal glue, frequently referred to as "hot glue," has been in use a long time and is familiar to all woodworkers. The desirable properties of animal glue are its great strength and reliability in the higher grades, its free-flowing consistency, and the fact that it does not stain wood. So far no glue has been found by the woodworking industry to be as suitable as animal glue for irregularly shaped joints, although a cheaper glue would be very desirable. The price of animal glue is the chief thing which limits its use. The fact that it is not highly water-resistant is occasionally a drawback.

Casein glue has been used for a much shorter time than animal glue, and its possibilities and faults are not so well known. It has sufficient strength for either veneer or joint work. It is used cold, and when properly mixed it can be spread with a brush. The property most praised is its high water-resistance, which makes it suitable for gluing articles to be used under moist conditions. Not all casein glues are water-resistant,

however; there are some on the market which are made to compete with vegetable glue and which have no great water-resistance. Among the disadvantages of casein glues are their tendency to stain thin veneer and the relatively short working life of some kinds. It is claimed that this trouble has been overcome to a certain extent in some glues. They are somewhat harder on tools than animal and vegetable glues. Possibly this objection can be overcome by altering formulas or by using different steel in the tools.

Vegetable glues have found wide use in recent years because they are cheap, can be used cold, and remain in good working condition free from decomposition for many days. They are extremely viscous, and it is not practicable to spread them by hand. Their lack of water-resistance and the fact that they usually cause staining in thin fancy veneer are factors limiting their use. They set rather slowly, and for this reason are not so well adapted for joint work. Vegetable glues have been studied and developed almost entirely by private initiative, and there has been much litigation over patent rights during the past few years.

Blood-albumin glue has shown notably high resistance to moisture, especially in the boiling test. This makes it particularly suitable for gluing together thin layers of wood which are later to be softened in hot water and molded. The production of molded plywood articles has been very limited, but it offers a good field for future development. In the past the chief drawback to the use of blood glues has been the necessity for hot-pressing, but recent tests have shown that a highly water-resistant blood glue may be developed which can be cold-pressed successfully.

Liquid glues are, in general, similar in properties to animal glue. Some brands are quite equal in strength to good joint glues, but other brands are very weak and unreliable. Their great advantage is that they come in prepared form, ready for immediate use. This makes them particularly suitable for patchwork and small gluing jobs. The factors which limit their use are their high price, their lack of water-resistance, and the difficulty in distinguishing between good and poor brands.

Generally speaking, at present vegetable and blood-albumin glues are veneer glues, while animal and casein glues are used both as veneer and as joint glues. As between animal and casein glue for joint work, if freedom from staining is important, animal glue is preferable; if water-resistance is of importance, then a casein glue should be selected. Because of the necessity of heat in the preparation and use of animal glue, the casein cold glue will probably be favored if both glues are otherwise equally well adapted.

HOW TO MAKE A MAGIC KNOT

THIS is a trick which, once seen, can be performed by anybody. We ask one of our friends to take hold of a handkerchief by two of its opposite corners, and to tie a knot on it without losing hold of the corners. This may seem not very easy—indeed, impossible; but, like many tricks, it is only necessary "to know how" to be able to do it without difficulty. All that is required

is that the person taking hold of the ends of the handkerchief should fold his arms before doing so. Then, by simply unfolding the arms, the knot comes on the handkerchief as a matter of course. A piece of string will serve as well as a handkerchief, but it should not be less than 18 inches long. Too short a piece makes the trick much more difficult to perform.

WHAT TO DO WITH A PIECE OF PAPER

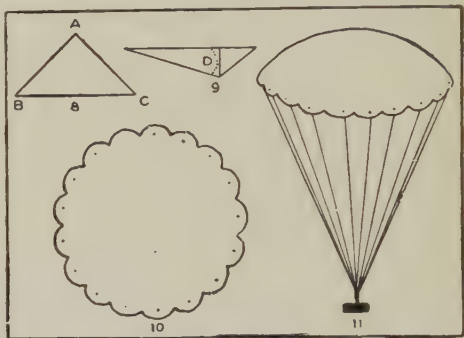
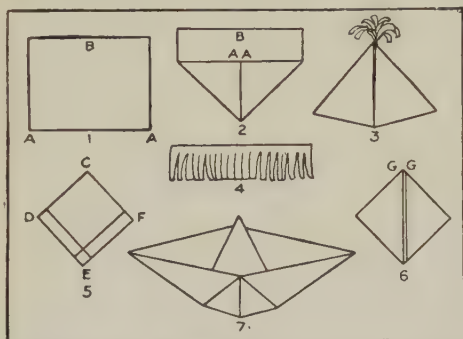
A HAT, A BOAT AND A PARACHUTE

HAVE you ever tried how many toys can be made out of a sheet of paper? With a little practice and skill we can convert a plain sheet of paper into any one of quite a number of delightful little toys. Shall we begin with the simplest of all, and learn to make a paper hat like that which you see in picture 3?

Take a sheet of paper—either plain or colored, or even newspaper will do—about 19 inches long and 14 inches wide; fold it in half to look like picture 1; turn up the corners *AA* until they meet

one side and the other on the other side, to meet point *C*, so that we again form a triangle. Once more hold the sides of the triangle and pull out to form a square as in picture 6. Finally, hold corners *GG* with thumb and first finger of each hand and gently pull out right and left until the boat is complete, as in picture 7.

Another very simple toy to make is a paper parachute. Take a smooth square piece of tissue-paper and fold it from corner to corner, making a triangle as in picture 8. Fold corner *C* to *B*; again



How to fold the paper to make the hat in picture 3, the boat in picture 7, and parachute in picture 11.

below *B* as in picture 2; turn down the top pieces marked *B*, one on the one side of the triangle and the other on the other side. Arrange the corners that stick out neatly by tucking one inside the other, and the hat is complete.

To make a cockade for our hat, cut a strip of paper as shown in picture 4, fold it in three, and push it in between the folds as in picture 3.

A paper boat is built up from a paper hat. When the hat is complete, we hold each side of the triangle in the middle with the thumb and first finger of each hand, and carefully pull out until the figure becomes square (double, of course) as in picture 5. Turn up the corners *E*, one on the

fold in the same way from corner to corner and fold in half as in picture 9. Take a pencil and mark curved line as shown by the dotted line in picture 9; then, with a pair of sharp scissors cut through all thicknesses of the paper round this line. Bore a hole at *D* with a stiletto; open out the paper, when it will look like picture 10.

We must now get sixteen threads of cotton of equal length; fasten one through each hole in the paper, bringing the loose ends together below. Fasten these together and attach a small piece of cardboard or stiff folded paper as ballast. Our parachute is now complete, and if taken out of doors on a windy day it will sail up a considerable height.

SOLUTION OF THE ROOM PUZZLE

ON page 1282 we have a picture of the interior of a room with seventeen things drawn wrongly in it. Here is a list of what these things are.

The door by which we enter the room has the finger-plates and handle and keyhole on the wrong side, being against the hinges. Going round the room we notice, first of all, the pictures: the oval picture is hanging from a hook which is placed upside down on the picture-rail; the next picture, a landscape, is upside down; and the one hanging in the corner has no hook at all. Looking down, we notice that the baseboard is reversed.

We shall be surprised to find that the maid is about to shovel on to the gas-fire some coal she has taken from a coal-scuttle which has quite an impossible handle. This handle is round the bottom of the scuttle in such a way that it could not possibly be swung round for the purpose of lifting the scuttle.

The hands of the clock are wrong, as the little hand would point to a minute or so past the hour

instead of just before it, if the minute hand was at the quarter past the hour. Let us go and look at the window. The fastener is the wrong way round, and the handle has been fixed on back to front.

Casting our eyes upward, we notice that the support for the curtain-pole is fastened on the top instead of at the side, which would prevent our putting the pole over it, and the knob by which we open the shutter is on its wrong side.

Moving round the room, we come against a hassock, the lugs of which are on the sides instead of on the ends. Let us take it up and we shall notice how very awkward it would be if hassocks were always made like this one. There is something strange about the dog, too. It is a spaniel with a collie's tail. The chair behind it has been very carelessly upholstered, for the pattern is the wrong way up; the castor has been fixed on the wrong way round.

Lastly, the floor-boards have been placed in the wrong direction, and what would happen to them underneath the carpet it is impossible to say.

THE WANDERING COIN

WE can make a box which has the power to make a silver quarter of a dollar placed within it disappear at command, coming back when we desire that it shall do so.

To start with, we must get a pill-box of wood or cardboard, as seen in picture 1, and of such size that a quarter lying flat inside it will exactly cover the bottom. If the box is of cardboard it will serve as it is, but if it is of wood we must line it inside at the bottom with paper pasted down smoothly. For the sake of uniformity, it is as well to line the inside of the lid in the same way. We must then take a quarter and cover one side of it with the same sort of paper, trimming it nicely round the edges. The coin thus treated will on one side look like an ordinary quarter, but on the other like a mere round of paper or cardboard.

To show the trick, we borrow a quarter. After it has been handed to us, we say that someone may like to see the box, and we hand it round for inspection. While the general attention is thus occupied, we secretly exchange the borrowed coin for the prepared one. This we must have concealed beforehand in the right hand, held, by bending the fingers slightly, against the lower joints of the second and third fingers. We lay the prepared coin, papered side downward, on the table where all can see it. The borrowed quarter we deposit secretly somewhere just out of sight, but where we can instantly get at it again when we want it—say, behind a book or other object that lies handy. It is surprising how small an object will serve to screen a coin, provided that the table is between ourselves and the company, as it should be when we are conjuring.

Having got so far, we take the open box in the left hand, and the prepared quarter between the forefinger and thumb of the right, taking great care to keep the uncovered side toward the company assembled in front of us, and place it in the box, but in doing so we tilt it so that this side shall fall forward. It will therefore lie with the papered side uppermost. We now close the box, and shake it up and down several times, which makes the coin rattle, and proves that it is still there. "Quarter, go!" we then command, and shake the box again, this time from side to side, in which direction the coin has no room to move, as it fits the box and so cannot rattle. "It is gone!" we say, and opening the box, we allow anyone to look into it. Seeing the paper side of the coin, they take this to be the bottom of the box.

"Now," we say, "I will bring the quarter back again." We close the box, saying, "Come!" Again we shake it, this time up and down. The

coin is once more heard to rattle, having apparently returned from its wanderings. "It has come back, you see!" We open the box, and turn the quarter quickly out into our hand, into which it will fall with the papered side downward. All present take it for granted that it is the borrowed quarter,

for which we must again exchange it, gaining opportunity to do so by once more inviting the spectators to examine the box, which, as you know, can tell no tales.

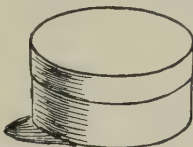
This is a very good trick as it stands; but we can produce a still greater effect with it by apparently conjuring away the quarter from the box altogether and reproducing it somewhere else. One very good way is to produce the real borrowed quarter, marked so as to prove that it is the same, from the very middle of a ball of wool. For this purpose we will need another little piece of apparatus, which again we can manufacture for ourselves. To do so, we take a piece of tin 3 inches long and $2\frac{1}{4}$ inches wide, and fold down its longer edges so

as to form a sort of flat tube, just large enough to let a quarter slip easily through it. The edges will be a little apart, as in picture 2. On one end of this tube we must wind Berlin wool so as to form a ball, the opposite end of the tube sticking out an inch or so, as in

picture 3. The wool should be of the heavy kind that ladies make anti-macassars of, and wound lightly. This ball, which should be about 3 inches in diameter, we put in one of our side-pockets, or, if we find it more convenient, we may have it in a bag on the table or in a drawer behind it.

Now for its use in the trick. When we have borrowed and exchanged the quarter as already described, and the box has been examined, we say, "Now I should like you also to see whether you find anything suspicious about this ball of wool." As we say this, we put the right hand, containing the borrowed quarter, into the pocket or the bag or drawer in which we have concealed the ball, drop the quarter down the tube, and draw out the tube. It will need a little practice to do this with one hand; but if we have taken care to wind the wool lightly we will soon be able to manage it. As we take out the ball, we squeeze it to close up the opening left by the tube. The ball now may be freely handled, for the coin cannot escape till

the wool is again fully unwound from the middle. When we work the trick in this way, instead of making the quarter reappear in the box, we order it to pass into the ball of wool, which we then hand to someone to wind off, say, round a book or card. When we drop the quarter into the tube we must be sure not to make a chinking sound which might betray the secret.



1. The coin box.



2. The tin tube.



3. The ball of wool with tube.

A LITTLE BOX THAT MAKES A WHIRLWIND

WE all know what a whirlwind is. Owing to differences in temperature, the air is set in motion in a spiral fashion, and sometimes the great whirling column of air rises to a thousand feet in height, and does an immense amount of destruction to property in the neighborhood where it is.

A whirlwind is not visible to the eye unless there is dust or other substance in the air, because we cannot see air in motion. In hot, dry countries, such as India or some regions of the United States or the Sahara Desert in Africa, whirlwinds lift up tremendous quantities of sand, and this makes the air very dense. In the small whirlwinds the direction of the air spiral may be either to the right or to the left. In the large whirls the direction is always the same and follows the direction of the storms in the district. "Simoom" is another name for the whirling dust-filled air screw.

It is to be hoped that none of us may ever be

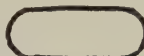
at any place where a really bad whirlwind is formed; but we may each of us make a miniature whirlwind in a very simple way. We take a box with a lid that swings backward and forward quite easily upon its hinges—a box such as the ordinary kind of cigar box that holds a hundred cigars—and knock out the bottom of it. Then we stand it up on its end, and swing the door violently. The door pushes the air in front of it, and when it is closed there is for a moment no air left in its track. But instantly air rushes in from all directions to fill up the vacant place, and the result is a miniature whirlwind. That the air is whirling round may be seen by putting down in front of the box some tiny fragments of tissue-paper, which are carried round and round by the cyclone. Of course, the larger the box the greater will be the whirlwind. A soap-box, which may be obtained from almost any grocer, is a very good size to use for this experiment.

THE MYSTERIOUS TUMBLING TABLET

THIS is an amusing little toy that is easily made. We cut two pieces of thick cardboard, $1\frac{1}{2}$ or 2 inches long and $\frac{1}{2}$ inch wide. Both of these we cut at each end to the shape of a semicircle. Now we get a strip of paper—writing-paper will do—1 inch wide, and gum it or glue it around the edges of the two pieces of cardboard in the position shown in picture 2. That gives us a tiny oblong box, as seen in the picture. But before fixing on the paper as we have already described, we place inside the box a few round lead bullets or large shot, but not more than will lie across the box in one row. Our "tumbling tablet" is now ready to commence its performances. All that is left for us to do now is to place it on any surface with a gentle slope and give it a little start. A tray tilted just a little, or a large book lifted a little higher at one end than the other, will do. Of course, we place the

tumbling tablet up at the highest part of the sloping surface. Perhaps it will need a start to go off, and if so, we need only roll it over once.

Then it will roll over and over, down the slope, looking almost as if it were alive. If we are really clever, we can easily understand why it behaves so. The balls or shots roll down the inside of the tablet until they reach the lower end, against which they bump, thereby causing the tablet to turn over. This movement lands the balls at what has become the higher end of the tiny box, and again they roll down and they will repeat the operation time after time, until they come to a stop because the bottom of the slope is reached. A tumbling tablet can be dressed up to represent Humpty Dumpty or some other laughable character. The tablet will be the body sewed inside a coat. The head, legs and arms must be made of soft material. This makes an amusing doll.



1. Shape of side.



2. Complete tablet.

ANSWERS TO THE PROBLEMS ON PAGE 1284

1. The question is "What does y-e-s spell?"
2. The boatman got 40 cents from the 2 extra passengers, but as his total profit was only 10 cents more by having the 2 extra passengers, the reduction of 5 cents each to the other passengers must have come to 30 cents altogether, so that there must have been 6 passengers in the original number or 8 in all.
3. If Brown had taken all the luggage he would have paid \$1.20 more excess than he did. Therefore \$1.20 would have been the excess charge on 120 pounds, which is 1 cent per pound. As Smith paid 20 cents excess upon a total weight of 120 pounds, his excess weight at 1 cent per pound must have been 20 pounds, so that 100 pounds was the weight allowed free. As Brown paid 30 cents excess for the share he took himself, that share must have been 100 pounds plus the number of cents in 30 cents, or 130 pounds, so that the total weight of luggage was 250 pounds.
4. Black saved \$3.60, which, with coal at \$6 a ton was the price of 12 cwt. of coal. As he received 1 cwt. per ton more than exact weight, he must

have ordered 12 tons and received 12 tons 12 cwt.

5. If the church clock struck 3 in the same time as the town-hall clock struck 2, the interval between the strokes of the town-hall clock must have been twice as long as the intervals between the strokes of the church clock. Thus the clocks would strike together at all alternate strokes. As they struck 1 together, the church clock would strike 3 when the town-hall clock struck 2; the town-hall clock would then have only one more stroke to make to tell the hour. Then the church clock would strike 5 as the town-hall clock struck 3, and the latter would have two more strokes to make to tell the hour. Thus the time was 5 o'clock.

6. The profit of three handkerchiefs sold at 8 cents each is the same as the profit of one handkerchief sold at 9 cents. Therefore the profit of one at 9 cents must have been three times the profit of one at 8 cents, and the difference between 8 cents and 9 cents must have been equal to the profit of two at 8 cents. Thus the profit of one at 8 cents must have been $\frac{1}{2}$ cent, and the handkerchiefs must have cost $7\frac{1}{2}$ cents each.

WHAT TO DO WITH A BOX OF BEADS

EVERY girl knows how to thread beads, and many little girls can make a ring of beads for their finger; but here we are going to see how to make something more interesting than plain chains and rings.

You will need two little bundles, or "hanks," as they are called, of glass beads, one pink and one blue, and a few bugle beads, the long round ones like little tubes. The hanks contain twelve rows of beads.

In picture 4 we see a plaited necklace with tasseled ends, just fit for a big doll. To make this necklace, separate three rows of beads from the hank, and without letting any slide off the thread, carefully knot the threads together at one end; then plait the three rows of beads—in the same way as you would plait your hair. Then knot the other ends of the thread close up to the finish of the plait.

Now, with a needle and thread begin the tassels. You will notice that a bugle comes next to the plait. To fix this on, tie the end of a thread (attached to the needle) to the end of the plait with a small knot, and then thread on the bugle in the usual way. Next thread on a big round bead of some pretty color (a pearl bead will look good if you can find one), and then take one of the glass beads from the hank and thread that on. Hold it close up to the big bead and put the needle through it *again*, drawing the thread tightly round the bead. This bead will now be firmly fixed; it keeps the big bead and the bugle in position while you make the tassel.

Still with the same thread take up twelve glass beads, push them up close to the fixed bead, and "fix" the last one—the twelfth bead—in the same way, by passing the thread through again and drawing it tightly. Now pass your needle through the eleven beads again, bringing it out at the other end. Each piece of the tassel is made in this way. So you see there are *two* threads in each piece and a fixed bead at the end. Make five pieces and your tassel is complete. When you have made a tassel at the other end of the plait, the necklace will be finished.

Now look at picture 3. This is a plain chain necklace with little "bobs," or pendants, hanging from it all the way round.

You begin by attaching one end of an ordinary fastener, or catch, to your thread. If you cannot find one of these from an old necklace, a piece of baby ribbon from a chocolate-box will make quite a pretty fastening.

Thread on about 20 pink beads, then 1 blue one, then 4 pink ones, 1 pearl (a good deal bigger to form the bob), and then 1 blue one again. This last blue one has to be *fixed* in the way we have already learned.

When the last blue bead is fixed, return the needle *through* the pearl bead and also through the 4 pink glass ones; then thread on 1 more blue bead and 10 more pink ones. You see now that you have made a piece of the chain with one little pendant hanging from it.

After the 10 pink beads you must thread 1 more blue one, and make another pendant in the same way, then 10 more pink beads, and so on, to the end of the necklace.

You can, of course, make it as long as you like—but you must decide how long it is to be before you start, because it is very tiresome to find that you have not enough thread on the needle. It makes the necklace look nicer if you add one more pink bead to the pendant each time, until you get to the middle; then leave one off each time in order to make the other side match.

If you look carefully at the picture you will see why this has been done—it makes the centre bob the longest, and gives a better appearance to the necklace.

Picture 1 shows a ladder bracelet made of bugles and blue beads. For these ladders you must work with *two* threads instead of one.

Take about a yard for each needleful, and tie the ends of the two threads together with a good big knot. Now thread on one bugle and pass both needles and thread through it; then put on two bugles, one on each thread; then a blue

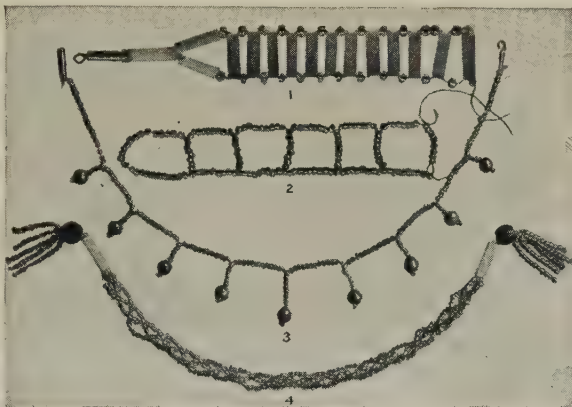
bead on each thread—that makes the start. The next bugle that comes is the first step on the ladder and goes "across."

To get this you put both needles through the bugle, one in at one end and one in at the other, so making the threads cross to the other side of the ladder. Next put on two blue beads, one each side, and then another crossway bugle in the same way as the last. Continue this until your chain is long enough for a bracelet. Then finish it off with three beads in the same position as the three you started with.

It will make it easier to manage if you fix the end, after you have made a start, to the table-cover or a pincushion. To do this, put a safety-pin through the knot at the beginning.

Picture 2 shows a ladder chain made of small beads only. It is made in just the same way as the bugle ladder, with two threads.

You start out with 12 beads on each thread, and then put 8 across, then 8 each side, and 8 more across. If you find that it is a little difficult to prevent it from slipping out of place when you begin, "fix" the last side bead of each 8 before threading on the 8 across. But you ought not to find this at all hard to manage. The result will be a very pretty ladder chain.



Bead bracelets and necklaces for dolls.

BALL GAMES FOR OUT OF DOORS

CATCH-BALL

ANY number of players can join in this game. It consists simply of tossing the ball from one to another, but it may be made more exciting if no special plan is followed as to whom the ball is to be thrown next. This keeps everyone on the alert, and a very good trick is to look at some other player than the one you intend to throw to. This nearly always leads to a slip on the part of the catcher.

TRAP-BALL

THE trap can be made of a flat piece of wood about 9 inches long and 2 or 3 inches wide, with a small hollow scooped near one end. Place this piece of wood on the ground, with some twig or small stone under it, so that the end opposite to the scoop is tilted up. Then lay the ball in the scoop and strike the lifted end sharply with a stick.

This will throw the ball into the air, and before it falls again the player must hit it with his stick. If he fails to do this twice, or hits it so that the ball is caught by another player, he is out, and the next takes his turn.

NINE HOLES

THOUGH this game is called Nine Holes, the number varies with the number of players. The holes are made in the ground side by side, and are numbered onward from 1, one hole belonging to each boy. Every hole has three or more small stones, called eggs, placed in it.

Ten or twelve feet away a mark is made, and one of the players rolls the ball from this mark toward the holes beside which the rest are standing. As soon as the ball drops into a hole all the players scatter as fast as they can, except the owner of that particular hole. He snatches out the ball and throws it at one of his running playmates. If he hits his mark, the boy who is hit loses one of the eggs from his hole, and in turn throws the ball at another player.

Every one who is hit loses an egg, and so does the thrower, *if he misses*. The player who is last to lose all his eggs is the winner.

FIVES

THIS is a game for two or four players. Draw on a flat brick wall a long chalk line, 3 feet 6 inches above the ground, and another one along the ground, 10 feet from the foot of the wall. Then across each end of this last line, which should be about 10 feet in length, draw another at right angles to it, and connecting it with the wall. These lines are to show where the ball is to bounce.

The players divide into two parties—we will call them A and B. A throws the ball against the wall, where it must strike above the chalk line, and when, on springing back, it bounces from the ground, B must strike it with his open hand, sending it against the wall again. Then comes A's turn to hit it on the bounce, and this is kept up, turn by turn, until someone makes a slip.

If the ball strikes beneath the chalk line, or rebounds *outside* the ground-lines, the side that did *not* make this mistake counts 1 to itself. The side that first reaches 12 or 24 marks wins, but any number may be chosen as the players decide.

EGG HAT

THE caps of the players are laid in a row on the ground at the foot of a wall; they should be tilted a little, so as to make it easier to toss a ball into them. The players then stand in a row at a line about eight steps away, and one of them pitches the ball at the hats. The moment this is done they all scatter, except the boy who owns the hat it has fallen into.

He must take out the ball as quickly as possible and throw it at one of the other players. If it hits him this boy must, in turn, pitch the ball at the hats.

But if the thrower misses him, a small pebble is placed in his cap as a bad mark, and when any player has missed so often that the number of pebbles in his cap equals the number of players, he is made to stand at a short distance while the rest throw the ball at him, each in turn. The game then starts afresh.

A pebble should also be added for every time a player fails to toss the ball into a hat.

THROWING THE BASEBALL

THIS game is good practice for boys. A place from which to start the throw should be marked by pushing a stick into the ground. If two are taking part in it, to see who can throw farthest, it saves time and running about if, after the first throw, the second player takes his stand where the ball has fallen, and throws back from there. Other sticks or twigs should be used to mark the distance of each throw.

CROSS-BALL

CCROSS-BALL should be played by two players standing two or three yards apart. They should start with two balls, and should each toss at the same time so that the balls pass in mid-air. It requires quickness of sight and hand to keep this up, but a little practice will make it easy, and by and by a third ball may be added, when the effect is very pretty.

Chestnuts, or any small round objects that are not heavy, or too hard, are better for this game than balls, as they are quickly and easily handled.

POSTURE OR STATUES

ALL the players stand in a large circle three or four yards apart, and throw the ball from one to another as rapidly as possible. Those who fail to catch it must remain as though turned to stone in the attitude in which they dropped the ball. The last to miss wins the game, and the rest must not change their positions until this winner has thrown the ball up and caught it ten times.

BOWLS

BOWLS is played on a smooth lawn; any number of players may take part in the game. The jack is a yellow or white ball which is placed on the grass near one end of the lawn. The players take their places at the other end with one bowl each. These bowls are large wooden balls heavier on one side than the other, so that when they are rolled toward the jack they do not, as a rule, roll in a straight line. Those whose bowls stop nearest to the jack win the game.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 1655.



The dinosaurs that roamed about the world in the Triassic Period.

THE TRIASSIC PERIOD

SO far we have been dealing with the rocks belonging to the oldest period of life on earth—the period known as the Primary or Palæozoic or Ancient Life Era. Now, with the Triassic Period, we enter on a newer chapter of life, known as the Secondary or Mesozoic or Intermediate Life Era.

In North America the change was marked by widespread changes in levels. The great interior sea floor gradually rose, the shores where sandstone and coal had collected in peace so long were squeezed up into folded mountains containing thirty to forty thousand feet of beds which formed the original Appalachian Mountains. These ranges, higher than to-day, ran from Newfoundland to Alabama; the Ouachitas of Arkansas were also folded then. At about this time the present Great Basin region became dry land, while the western border of the ancient land was covered by the sea.

About this time there seems to have been a marked and noticeable change both in the general character of the rocks and in the general nature of life. From this point the crust of the earth appears to have been more steady and stable, and the rocks somewhat different in their structure and disposition. In the Primary Era the crust of the earth seems to have been subject to violent alterations and contortions,



and its rocks are much more broken, twisted, crumpled and displaced than

in the Secondary Era. In the Primary Era, again, the volcanoes were enormous and numerous, and seem to have

been in a state of continual activity, pouring forth floods of lava which covered hundreds of square miles thousands of feet deep, while in the Secondary Era volcanoes were comparatively small and few, and were rarely in violent eruption. However, in British Columbia and extending into Alaska there were many volcanoes, and there is much volcanic rock. In the East through great cracks the igneous rock forced its way to the surface. The Palisades of the Hudson broke through at this time.

With respect to animal and plant life, too, the Secondary Era seems to have been a new starting-point. The trilobites passed away; the crinoids became more numerous; the giant ferns and horsetails and mosses dwindled and were replaced by pine trees and cycads; and the dicotyledons began to dominate the plant world. In all, fossils of about 400 different plants have been found in Triassic rocks, but only about 150 in North America.

The Triassic rocks, which are taken as the rocky boundary line of this new period of the earth's geological and biological history, are to be found at

or near the surface all over the world. Like the Carboniferous rocks, they are of two kinds—one kind formed in lagoons and lakes and another in deep seas.

The lagoon type consists of red sandstone and clays, with bands and layers here and there of salt and limestone. It is found in various parts of England, and also in the west and centre of Europe, and in the eastern states of North America. These rocks were formed of the mud of slowly evaporating briny water, and are often marked with sun-cracks, ripples, raindrops and the footprints of animals such as labyrinthodonts. There is also some coal.

The deep-sea type consists of great masses of limestone and dolomite sometimes thousands of feet thick, and is much more extensive. It is found in the Mediterranean basin, and stretches thence through the Carpathian Mountains and southern Russia right into Asia and India. It is also found in Spitzbergen, Japan, North and South America, New Zealand and Southern Africa. It contains sea creatures of many kinds.

The United States shows all three types of Triassic rocks. Along the eastern boundaries of the old Piedmont metamorphic series, many lagoons, estuaries and bays filled with sandstones and shales from the wasting crystallines. Even peat bogs and swamps formed, giving good coal beds to Virginia and North Carolina. The red sandstones and shales of the Connecticut valley, north-western New Jersey, central Maryland and elsewhere belong in this class. They have been greatly broken and also invaded by volcanic rocks since they were deposited.

THE PLAINS OF ENGLAND AS A BROAD LAGOON

A like great inland sea, but a salty one, has proved of great importance to modern England, for from its brine was deposited the rock-salt beds of Cheshire and Droitwich. In places the sea must have been very deep, for beds of salt are found 90 or 100 feet thick. Hundreds of thousands of tons of salt are produced every year by English mines, and the supply is believed to be almost inexhaustible.

The plant life of the Triassic Period does not seem to have been nearly so rank and luxuriant as the plants of the Carboniferous Period, when the great coal forests of fern trees and club-mosses

flourished; but in New Zealand and Australia, and in some other parts of the world, there is coal made from Triassic forests. There were still ferns, cypresses and other cone-bearing trees, but the most abundant and characteristic trees of the period were cycads—plants like great ferns in appearance, but with tufty tops, and related not to ferns but to pines.

Animal life in and around the salt lagoon was apparently not very plentiful. Probably the water was too salt to be suitable for most amphibians and fishes, and the general land conditions were not favorable for land animals. Still, bones of reptiles and labyrinthodonts have been found, and also large numbers of footprints. Skeletons of fishes and shells and wing-cases of insects are found.

THE REPTILES AND THEIR MONSTER FOOTPRINTS IN THE SAND

The reptiles varied greatly in character. Some resembled lizards; some, like the dinosaurs, walked on their hind legs; some, like the nothosaurs, swam in the sea. The dinosaurs were particularly interesting. They were clumsy, heavy, unwieldy creatures, and some walked on their hind legs. Their footprints show impressions sometimes of three, four or five toes. Some of the footprints are nearly two feet long.

Some of the dinosaurs ate flesh and some vegetable food, judging by their teeth. Some were small, while others were at least eighty feet long, including the long tail. One which must have weighed more than the largest elephant had such a small head that its brain could not have weighed one-twentieth as much as that of our elephant. It was covered with heavy armor like that of a crocodile.

Many fossils of these strange reptiles have been found in different parts of the continent. In the West almost perfect skeletons have been found, but the largest was found in Africa.

In the open seas of the Triassic Period animal life was much more abundant than in the inland lagoons. Corals forming coral reefs, foraminifera, sponges, crinoids, and creatures like shrimps and prawns flourished exceedingly. Particularly numerous were the molluscs, and there are more than a thousand species of cephalopods, including ammonites and the first belemnites. Some of the ammonites were as big as cartwheels.

THE NEXT STORY OF THE EARTH IS ON PAGE 1545.

LIFE AND REMAINS OF THE TRIASSIC



This picture-diagram shows a possible landscape of the Triassic Period and some strange, weird creatures. We see the early crocodile, the long-nosed ichthyosaurus, and the long-necked plesiosaurus.



Fossil remains of the creatures shown above: the plesiosaurus, pelagosaurus and ichthyosaurus.

THE STORY OF RUBBER



Rubber is a substance obtained from the milky juices, called latex, of about seventy kinds of tropical and subtropical plants. The best Para rubber trees grow in Brazil, and it was from the seeds of these, smuggled out by Mr. H. A. Wickham in 1876 and carefully tended at Kew Gardens, that the plantation industry in the East was founded.

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Chinese tappers with pails of latex on the Dunlop Rubber estate.

THE STORY OF RUBBER

MANY times small things have changed the world. We see it in the ravages of the boll-weevil, which is injuring the cotton plantations of America and threatening to slow down European mills. On the other hand, another insect, a wood-boring beetle, did the world a good turn when it began to attack a tree and caused the tree to give out a juice to heal its wounds. So far as we know, motor cars and bicycles might not have developed without rubber, and we might not have found a substance for making cables under the sea.

This is one of the most wonderful materials in the world—the thing we still call India-rubber though it has nothing at all to do with India. The juice perhaps first astonished man in the forests of Mexico and the Amazon when it oozed from certain trees, vines and shrubs to heal the wounds in the bark caused by the wood-boring beetle. It protected the tree by becoming solid and imprisoning the insect as we find a fly imprisoned sometimes in amber.

The story of rubber before the first Europeans came to the New World is lost in the mists of time. Probably the first white men to be astonished by the sight of it were the crew of Columbus, who, late in the fifteenth century, found the natives of Haiti

CONTINUED FROM 1313

playing with solid balls which bounced up into the air. They were made of the gum of a tree. In 1615 the Spaniards were known to use the crude gum to wax their canvas cloaks so that they would resist water; and La Condamine, who in 1731 was sent on a scientific expedition to the Equator by the Paris Academy, sent back samples of a blackish resinous mass called caoutchouc, which is rubber, and reported that the natives of Peru and Brazil covered linen with this material and wore rubbered shoes.

Nearly two hundred years after the Spaniards used it people began to pay attention to this remarkable stuff which they found in use by the natives of America—the Indians. So that they named this stuff Indian-rubber, after them. In the meantime, rubber had found one use, and one to which children still put it. Dr. Priestley mentioned in 1770 that it was useful for rubbing lead pencil marks off paper, and that a little cube of it, about half an inch square, could be got for three shillings, that is, about seventy-five cents.

Even at this price artists were glad to have it, but that was practically the only use known for it. About twenty years later, in 1791, the first attempts were made to use rubber in

industry. Then Samuel Peel invented a process for covering cloth with rubber dissolved in turpentine. For waterproofing garments it was smelly and sticky, but the idea led to attempts by other people. In 1823 Charles Macintosh, a thoughtful Scotsman, made more satisfactory waterproof coats, called mackintoshes after his name.

Now the natural rubber was very sensitive to changes of temperature; it became stiff and hard when cold, and soft and sticky when hot, so that a waterproof which was stiff in cold weather and sticky on a damp, warm day, or beneath the sun's rays, was very uncomfortable. When soft it had a horrible odor.

THE GREAT DISCOVERY OF THE PROCESS OF VULCANIZING RUBBER

Inventors were hard at work seeking to overcome this when Charles Goodyear, in America, accidentally made the discovery which may be looked back upon as the greatest step in the development of the rubber industry.

This was the notable discovery, in 1839, of *vulcanization*—the discovery that by heating powdered sulphur with soft rubber the rubber lost its sticky character and became elastic, pliable, and pleasant to the touch over a wide range of temperature. Goodyear had been working at his discovery for years, suffering bitter poverty and the jeers of his fellow-men, but he ultimately conquered. At the same time Thomas Hancock, an Englishman, was working along the same lines.

While others proceeded to new discoveries by varying his method, Goodyear found that by adding more sulphur than he had first used and by heating the mixture at a higher temperature for some hours he could produce a hard substance like ebony; and so we got vulcanite, from which are made many things, such as phonograph records, combs, pipe-stems, and so on.

Dozens of uses for the new material immediately developed, and the demand increased, but still the supply coming from the wild trees was sufficient. Then came two inventions which increased the demand enormously, cycles and motor cars. There had been cycles of a sort before Goodyear's discovery—"bone shakers" they were often called, but the rubber tires made them popular. But, as those who are old enough to have rid-

den the old velocipedes, or the first "safeties," will remember, the first rubber tires were small and solid. How they jolted and jarred along the stony highways, carrying the rider home with his teeth aching and his wrists almost shattered! Motor cars could never have been run at high speed with tires of this sort.

MR. DUNLOP'S IDEA OF MAKING AN AIR CUSHION TO RIDE ON

Though in 1845 Robert William Thomson had taken out a patent for an air-filled tire, nothing came of it. In 1888 Mr. J. B. Dunlop, a veterinary surgeon in Belfast, thought out afresh the idea of making an air cushion for a bicycle tire. He was a long time working at it, and at first he fitted one on a block of wood and trundled it about his yard. It answered well enough, so he made and fitted a tire of this sort to his own bicycle, then put one on his son's machine, enabling the boy to win a race which he had entered.

The principle of this first Dunlop tire was the same as that which makes our motor car and bicycle run so delightfully to-day. The inner tube is made of comparatively soft, thin rubber; it is that which we blow up with air. The cover which fits over this is stout and hard, to protect the inner tube from injury. It is the tube beneath the cover, filled with air, which has worked the marvel. The wheels of a bicycle or a motor car actually run on compressed air.

THE BIG DEMAND FOR RUBBER THAT GREW UP EVERYWHERE

Mr. Dunlop's invention was taken up by a keen man of business and hundreds of thousands of bicycle tires were made. Perhaps your parents have told you of the time when nearly everyone rode a bicycle. When the motor car became a success, about 1900, more and more rubber was needed. To-day the invention has gone all over the earth, and there are in the United States enough motor vehicles to allow every person in the country to be riding at once. In every country there are bicycles, motor cars and airplanes using these wonderful tires. The little tube of air has made one of the greatest revolutions of modern times.

Men soon learned to value the rubber tree. Once, when the American native wanted rubber, he gashed the tree with a hatchet; he got plenty of juice, but insect and fungus pests got into the

THE QUEER FORM OF A BIG RUBBER TREE



Here is the Assam rubber tree, a near relative of our edible fig tree, and also a relative of the banyan tree, which it closely resembles with its hanging branches that take root in the ground.



This picture shows clearly the strange form taken by the roots of the Assam rubber tree, or elastic fig. These roots form a spreading network for some distance round the trunk.

wound, and the tree died. Now trees are cut (or tapped) by special knives which make a cut just deep enough for the latex to flow out. Cutting is started well up the tree, and is made lower and lower week by week.

THE DARING OF THE MAN WHO BROUGHT THE SEEDS TO KEW

One of the greatest romances of the rubber industry is the story of an English botanist, Mr. H. A. Wickham. Mr. Wickham knew that the wild *Hevea brasiliensis* tree yielding the finest rubber known, called Para, grew in Brazil, and he believed the tree would flourish in other parts of the world. He therefore set himself to learn all about it. He laid his idea before Sir Joseph Hooker, who was then in charge of the Botanical Gardens at Kew, near London, and together they decided that India and the Malay States were suitable for making an experiment in growing the *Hevea* tree.

Mr. Wickham collected thousands of seeds in Brazil, but the authorities were jealous of their industry and would not let the seeds out of the country to start a rival industry. Mr. Wickham was able to hire a ship, got his seeds on board, spread them out on crates in the hold, and managed to get the ship cleared before the Brazilian authorities heard a whisper about it all. Mr. Wickham carefully tended his seeds on the voyage home, chartered a train at Liverpool, and finally reached Kew late one summer night with his precious cargo.

SEVEN THOUSAND YOUNG RUBBER PLANTS IN KEW GARDENS

The orchid and propagating houses at Kew had been specially prepared for him, and the *Hevea* seeds were planted. They thrived so well that "a fortnight afterward," Mr. Wickham says, "the glass-houses afforded a pretty sight—tier upon tier of young *Hevea* plants, 7,000 odd of them." The young plants were shipped off to India, Ceylon and Singapore. At first progress was slow, and it seemed that the culture of rubber would not be profitable. As the demand increased and the price rose the growers were encouraged and planted more trees.

As late as 1910 nearly all the world's rubber came from Brazil and Africa, Brazil producing 41,000 tons and Africa 21,000; only 8,000 tons was cultivated on plantations. By 1915 nearly 160,000 tons were grown, of which only 50,000

came from Brazil, Mexico and Africa. By 1921 something like 1,700,000 acres of trees were in bearing, yielding about 400 pounds of rubber an acre, or over 300,000 tons; so that, with about 50,000 tons of wild rubber, the world's total production was over 350,000 tons. The United States uses more rubber than all the remainder of the world together. Lately experiments have been made in shipping the liquid latex before it has hardened, and considerable success has been achieved. Artificial rubber can be made, but the cost is too great.

THE USES OF RUBBER ARE CONSTANTLY INCREASING

Not all rubber comes from the *Hevea*. Many plants yield rubber, and at least a half dozen are important. However, the wild Para is still considered the best. Whether this is because some of the impurities which get into it really add to its strength, or because the wild Para usually comes from older trees than those on the plantations, is not settled. The plantation rubber seems to be improving as the trees get older.

The uses for rubber are constantly increasing, though more is used for tires than for any other purpose. In fact, the World War showed that civilized men cannot get along without rubber. It is used for clothing, tents, hose, belting, insulation on electrical work, in making special kinds of varnish and glue, and for dozens of other purposes in industry. Surgeons and dentists require it. In fact, rubber, hard or soft, has a thousand uses, as it enters in some form or other into nearly every trade, occupation or sport. Lately experiments have been made with roads and pavements of rubber, and perhaps we may some day live in silent cities. Floors of rubber, or of rubber compounds, have been in use for years. Whether rubber paving will be durable is the question to be settled.

SOME POSSIBILITIES OF FUTURE USES OF RUBBER

The world is perhaps on the eve of great developments in the use of rubber, for, if researches now going on prove to be satisfactory, liquid rubber shipped from the plantations will be used in the making of paper, to make paper tough and waterproof; in cement and terra-cotta, to make them damp-proof; and in fabrics of all kinds that are exposed to the weather.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 1549.

HOW THE RUBBER TREE IS TAPPED



The juice-bearing vessels lie just beneath the bark, and when it is cut, the milky latex oozes out. Care must be taken not to cut into the layer beneath the latex, or fungus pests and insects will kill the tree.



In Brazil wild rubber trees are tapped by striking them gently with a small ax, making several cuts in a tree. But tapping knives, shaving the bark off and avoiding deep cuts, are generally used.



Trees are cut in patterns, often herring-bone or spiral. A new cut is made every day. The latex, containing globules of caoutchouc, the essential substance of rubber, runs into a cup.



A native girl tapping rubber in Ceylon. The latex must be cured at once, or it putrefies and yields a poor product. A young tree, if carefully tended, yields about three pounds of dry rubber a year.

GATHERING AND SHIPPING RUBBER



Ceara, or Maniçoba rubber, comes not from the Hevea, but from a species of Manihot. The latex of this tree does not flow freely and coagulates in little balls on the trees. Here you see men removing them from the trunks in Brazil.



Here we see the bales of crude rubber on the bank of the Amazon River awaiting the boat on which they will begin the long journey to the factory. They may be made into the very motor tires on which you will ride, or into rubber boots for use on a winter day.

GROWING RUBBER ON THE PLANTATIONS



Where trees are grown on plantations they are sown and carefully protected until sufficiently big to plant out. Depending on soil and climate, they are usually from eighteen to twenty-four inches in girth and from four to six years old before they can be tapped. Natives are here seen tending young rubber plants in a French colony. Other crops, such as tea and cocoa, are sometimes grown among the rubber.



The most valuable form of rubber, called Para, comes from the Hevea tree, a native of Brazil, now cultivated in Ceylon, Malaya, Sumatra, Java and Borneo. Another important tree is the Ceara. Natives are here seen tapping on a plantation in the Malay States, the full herring-bone cut being used.

THE BRAZILIAN AND HIS PALM KERNELS



The South American "cures" rubber by smoking it over a fire of palm kernels. He dips a paddle-shaped instrument into the latex, and turns until the latex clots owing to the acid in the smoke.



He now pours more latex on the clotted piece and repeats the process until a big ball is formed. This is split and removed from the paddle, and is known as Brazilian fine Para, a rubber of the highest grade.

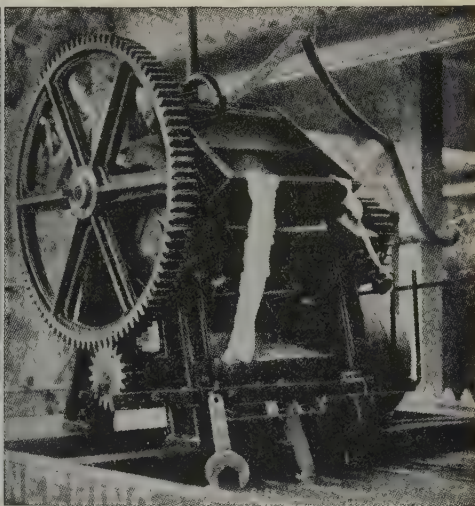
RUBBER RUNNING THROUGH FINE GAUZE



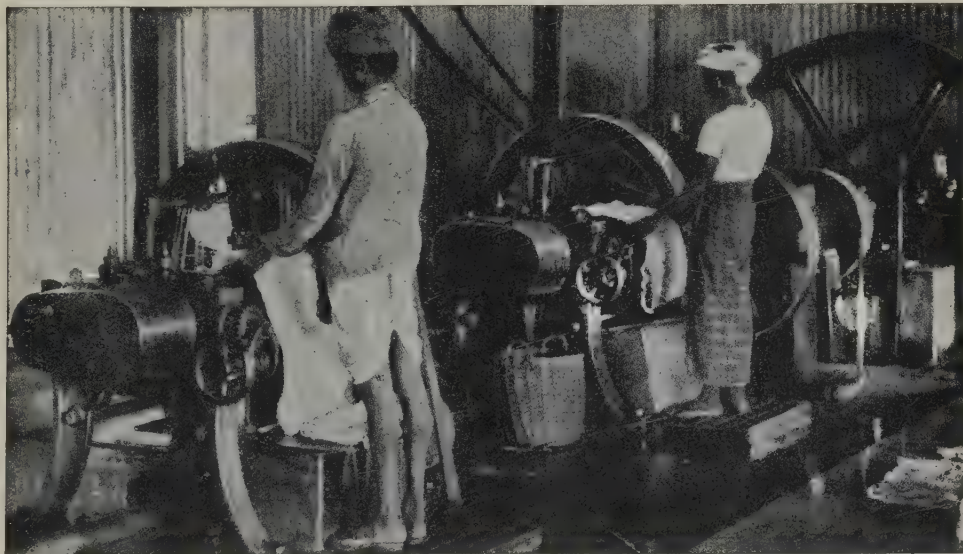
The latex collected on plantations is taken to the factory and strained through fine gauze to remove bark and other impurities. It is then poured into vats and made to coagulate by stirring into it some acetic acid.



After coagulation the rubber is a spongy mass looking much like junket, but stiffer and harder.



A washing machine then squeezes out most of the water and rolls out a long sheet known as crêpe.



Natives making crêpe rubber in the Malay States. Such rubber, which may retain from 10 to 15 per cent of water, is dried in stoves, or in a vacuum, before being packed for export. Then it is rolled again.

RUBBER IS READY FOR THE FACTORY



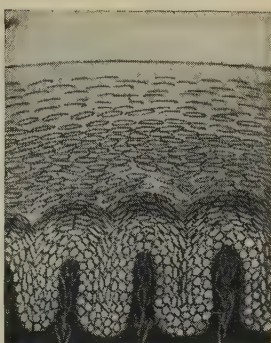
Some smoked sheet rubber is made by coagulating the latex in pans and then squeezing it to remove moisture. To prevent mold it is smoked over fires, or cured by smoky fumes of creosote.



If circular instead of rectangular pans are used, the product is known as biscuits. Here biscuits of rubber are seen drying. Smoked sheet is often considered much better than crêpe.



Plantation rubber is carefully packed and weighed for export. It is marketed as either pale or smoked, and in the form of sheets, biscuits, crêpe, block and loaves. The growing, careful collection, and treatment of plantation rubber now forms a vast industry, which is likely to extend as new uses are found for rubber. Rubber photographs are by courtesy of the Federated Malay States, the Dunlop Rubber Company, Underwood & Underwood, and David Bridge & Company.



The first drawing shows hair enormously magnified. The others show how the nail grows on the finger, the last one, much magnified, showing the finger as if it were cut across and through the nail.

THE COVERING OF OUR BODIES

SOME of us may think, perhaps, that the skin is not a very interesting part of the body, but that is very far from being the case. We shall see some of its wonders below.

Even if we were to think of the skin only as a material, and were to compare it with silk, or rubber, or paper, or cloth, we should find that it is far more wonderful than any of these. Nothing that human beings can make is at all equal to it. But it is indeed far more than a material, for it is alive, and besides being the covering of our bodies, it is one of the instruments by which the brain is made acquainted with the outer world.

We know that if we do not have enough light, growth is interfered with, and the blood becomes pale. We know, too, that we breathe more deeply under the influence of light; and that in a fixed time animals take in more oxygen and give out more carbon dioxid in the light than in the darkness. This is due to the effect of the light on the brain; but it is not a direct effect, for the brain itself lives in darkness. It is due to the way in which certain nerves running to the brain are affected by light.

These are the nerves of the eyes and the nerves of the skin in general. For instance, an animal does not breathe so well or deeply if its eyes are bandaged.

CONTINUED FROM 1331



But the eyes are not alone responsible for helping the brain. The skin,

also, has something to do with it. This is true even though we can see by the eyes and not by the skin. It is good, then,

to expose our faces and our hands to the light; and sometimes, when people are ill, they are helped to get well again by taking what are called sun-baths, that is to say, by taking off their clothes and exposing all their skin to the sun. It is the action of the light on the skin that helps to make bathing in the open air so pleasant and healthful. It is probably rather a drawback to us that we cover up nearly the whole of our bodies so that light cannot play upon the skin; but it is at least well that we should live in the light as much as possible.

We must particularly remember that it is sunlight or daylight to which, through long ages, our bodies have become adapted. It is a great pity we do not use all the daylight we can. We suffer in health and strength through getting up many hours after the sun rises, and living by artificial light after the sun has set. Our bodies were certainly meant to live in the open air and in the light of day. Even the best-ventilated building is not so good as open air, and the best kind of artificial light which men have been able to invent is not so good as daylight.

Now we may pass on to look at the way in which the skin is made, and we may notice some facts about it which we can all see for ourselves. In the first place, the skin is perfectly elastic. If this were not so, we could not move our bodies; for every time we move, the skin is stretched somewhere, and then, by its elasticity, returns to its first position. Anyone can see this for himself by pushing the skin on the back of his hand into folds, and seeing how perfectly it comes back again. One or two cases have been recorded where people had skin which had lost its elasticity, and they found it as difficult to move as if they had been cased in stiff armor with no joints.

WHY OUR FACES TELL SOMETHING ABOUT OUR CHARACTERS

Even the most elastic thing in the world, however, has limits to its power, and this is true of the skin. We notice that, as the years pass, the skin of the face begins to show lines and folds according to the way in which it has been moved. This depends upon our feelings. The bright and happy person shows his feelings by moving the skin of his face in a particular way; so does the person who is always thinking; so does the person who is gloomy and always worries. In the course of time lasting marks are made in the skin of the face, telling us something about the character of the person. The best kind of beauty of the skin lasts all one's life, and depends upon the kind of life we have lived. Age makes it only more beautiful.

One of the marks of age in the skin is that it loses its elasticity. Often, also, it becomes very thin. In extremely old people the wrinkles that used to be present in the face often disappear, and the skin becomes thin and smooth. But we must pass to other features of this wonderful living material.

THE MOST WONDERFUL WATERPROOF MATERIAL IN THE WORLD

The skin has a very beautiful texture. This has been compared to velvet, to the skin of a peach, and so on; but there is nothing else that has all the qualities of the surface of the skin when it is well cared for and has not been too much exposed to rough weather. We are so made that this gives us pleasure. Everyone likes to rub his finger against the cheek of a child, for there is nothing else that feels quite so nice. Another most important feature of

this material is that it is waterproof, but in one direction only. By means of certain special arrangements the skin is able to take water from the blood and allow it to escape; but water cannot enter through the skin, not even through the little channels by which the perspiration comes out. It is, of course, most important that the skin should be waterproof, yet it is also important that it should be able to remove water from the blood, as we shall see. It would be hard to find any other material allowing water to pass through it in one direction while being waterproof in the other direction.

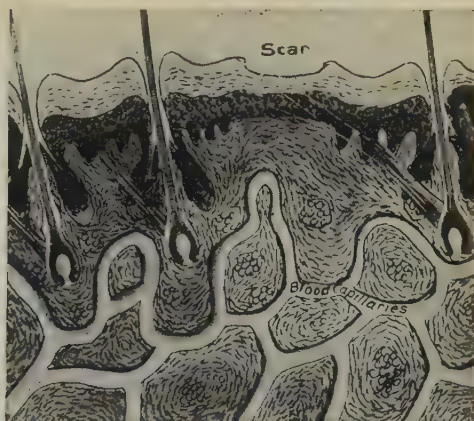
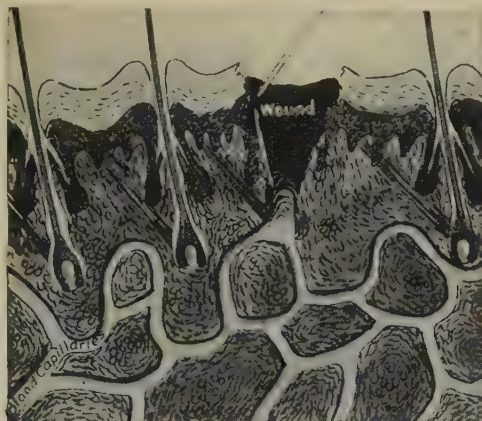
The first use of the skin that occurs to anyone is, of course, that it protects all the tissues underneath it from dirt. If the outside of the skin were itself alive, it would be bound to suffer seriously from the dirt which it so often encounters; but almost the most remarkable thing about the skin is that, though it is a product of life, the outside of it is not really alive.

THE OUTER SKIN THAT IS NOT ALIVE AND THE INNER SKIN THAT IS ALIVE

The outside of the skin, indeed, is made of very much the same material as the nails are made of, or the hoofs of a horse, or various kinds of horns. Every time we wash—every time the skin is rubbed at all—a great deal of its outer layer is rubbed off. When we come to study the skin closely we find that it may quite distinctly be divided into two layers, an outer and an inner layer. The Latin name for the skin is *dermis*, and the inner layer of the skin is called the “dermis,” or true skin. It is really alive; it bleeds when it is pricked, and it hurts when it is touched. The layer that lies outside it is called the “epidermis”—*epi* simply meaning “upon.”

This epidermis is made by the dermis, and is being constantly renewed from moment to moment as it is rubbed off. It has no feeling in it, for there are no nerves in it, and it can be rubbed off, or can even have a needle passed through it without bleeding, for it has no blood-vessels in it. We know that it is quite easy to pass a needle through the skin at the tip of a finger without feeling anything and without drawing any blood. The epidermis is very thick there, and we simply pass the needle through that. It is the epidermis that grows over the base of the nails. If you are reading very carefully, you will say that anything which grows must be alive, and we have just said that the

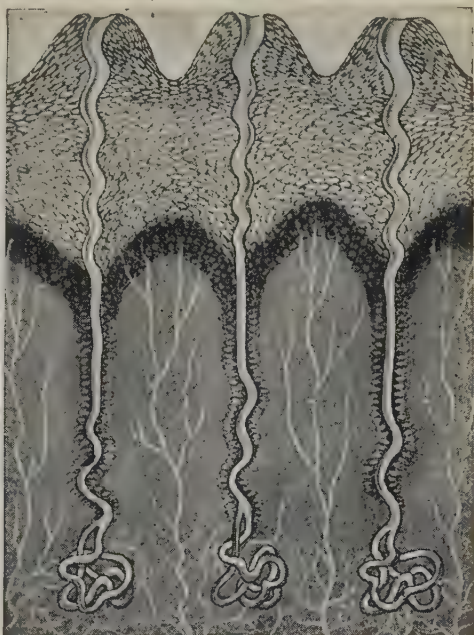
WHAT THE SKIN IS REALLY LIKE



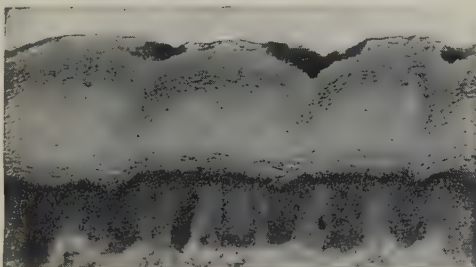
These pictures show how a wound in the skin is healed. In the first picture a capillary is shown growing into the blood-clot; in the second picture the scar has formed, but a hair is permanently lost.



The layers of the skin—the horny layer, or cuticle, above, and the true skin below. The hairs pierce the cuticle, with glands and muscles attached.



The sweat-glands begin in twisted coils in the true skin, are continued as long tubes piercing the cuticle, and end in pores at the top of the papillæ.



The picture on the left shows the skin of a white man; that on the right shows the skin of a black man. It will be noticed that the dark pigment in the black skin is in the deepest layers of the cuticle.

epidermis is not alive. That is perfectly true. The thin skin that grows on the base of the nail is not alive, and does not grow itself. It is really pushed from behind by the new cells which the true skin is always forming behind it.

HOW THE SKIN CHANGES, AND THE LIVING CELLS PUSH UPWARD AND DIE

The whole skin is made of cells—both the true skin and the outer skin, or epidermis. The cells of the true skin are alive, and when they grow to a certain point they divide into two, and make new cells. This goes on always. It is in the deep layers of the skin that it goes on; and so it happens that the cells which have been already made are pushed upward and outward toward the surface by the young cells formed beneath them. After a time the old cells die; they become thin and flat and horny, and they form the epidermis, or outer skin. They protect the true skin and the whole of the rest of the body. A great deal of dirt from outside soaks into them, but soon they are rubbed away, and other cells take their places. In this way we are able to keep the surface of the body clean from day to day. The true skin contains much in it besides the cells that grow and divide and make the epidermis, but the epidermis itself has no other structures in it, and no more need be said about it.

Any part of the body that has the business of making special fluids is called a gland; glands in the stomach, for instance, making the digestive juices. Now, we find that the true skin contains a large number of glands that have a special purpose; they are called sweat-glands, and consist simply of a long coiled tube the end of which passes through the epidermis to the surface of the skin.

THE LITTLE TUBES THAT CARRY OFF THE WATER FROM OUR BODIES

These tubes are lined with cells, and outside them is a rich supply of capillary blood-vessels. In every part of the skin we find these sweat-glands, and they are working nearly all the time. We must not think that we perspire only when we can see visible drops standing on the skin. That happens only when the sweat-glands are very actively at work. But even during an ordinary day, when you have not noticed at all that you are perspiring, the skin discharges about twenty-five ounces of sweat. When we examine the sweat, we find that it is ninety-nine per cent water;

the remaining one per cent is made up of a number of things, including common salt. Sweat is slightly acid when it is produced.

In course of time the watery part of sweat passes into the air as water-vapor, but the solid part is left upon the skin, as the salts of sea-water are left in the sea when the water passes into the air. Even the cleanest skin contains many microbes, and some of these act on the solids that are left from the sweat, so that they are changed into something else that is unpleasant. This is one of the chief reasons for keeping the skin clean.

The production of sweat is one of the most useful things the skin does. Some of the solids of sweat are poisonous substances the body needs to be rid of. The skin, through its sweat-glands, is one of the channels by which we dispose of waste products. But we must not think that there is no use in the ninety-nine per cent of water that is found in sweat. For one thing, it is good in itself that there should be a constant stream of water through the body, because water helps most chemical actions, and because it helps to dissolve and carry away things we do not want. But the water in the sweat has a special use of great importance.

HOW OUR BODIES ARE KEPT COOL IN SUMMER AND WARM IN WINTER

It is necessary for the health of all the higher animals, and specially necessary for our health, that the temperature of the body should be kept at a fixed point, no matter whether it is summer or winter, day or night.

There must be some way, then, of regulating the temperature, and this is done mainly by means of the sweat. In very hot weather it is necessary for us to keep cool. The body must lose much heat somehow, or its temperature will rise above the fixed point necessary for our health. So we produce a great deal of sweat, as everyone knows, and when the water in it leaves the skin it takes away a great deal of heat from our bodies. The same thing happens even if we put water on the skin from the outside. If, when you wash your hands, you dry only one of them, you soon find that what we call the evaporation of the water from the wet hand makes it much cooler than the other. Then, on a very cold day, when we need to keep all the heat we can, we perspire very slightly. Thus, the figure quoted above—twenty-five ounces a day

—is only an average figure. The amount of sweat produced depends chiefly upon the body's need for heat.

You must have noticed a dog lying panting, with its mouth wide open, on a very hot day. The dog has sweat-glands only on the skin of the pads of its feet, and so it practically cannot use our method of keeping cool on a hot day. That is why it suffers so much from the heat, and has to breathe quickly to get rid of as much water as possible by its lungs.

WHAT HAPPENS WHEN THE WEATHER IS WHAT WE CALL "CLOSE"

Then, again, you must have noticed how uncomfortably hot you become when the weather is what we call "close." On another day the sun may be hotter, yet we do not feel oppressed at all. The reason is that on the days which we call close, or muggy, there is a great deal of water already in the air. Now, the more water there is in the air, the more slowly can it take up any extra water. Indeed, the air may be so full of water that it will practically take up no more. This means that the sweat cannot evaporate from the skin, and so we cannot become cool in this way. We are as badly off for the time as the dog, which can scarcely sweat at all. But on other days, though the heat of the sun may be intense, and though the air around us may be just as hot, yet it may happen to contain only a little moisture, and so our sweat evaporates quickly and keeps us cool, and we do not find the heat at all oppressive.

THE DRUGS THAT ACT ON THE TINY SWEAT-CENTRE IN THE BRAIN

Now, there must be some way in which the sweat-glands are controlled. There must be some centre which orders them to act as they are needed. This is so. The sweat-centre lies in the lower part of the brain, and from it proceed nerves which carry its orders to the millions of sweat-glands in the skin. Then, when the blood becomes too hot, the sweat-centre in the brain which has the hot blood passing through it gives an order, and the sweat-glands are set in vigorous action. There are various other ways in which the sweat-centre may be disturbed; for instance, a man may sweat in great fear, even though he is quite cold.

But sometimes the sweat-centre is poisoned and does not act properly. For instance, during fever the blood is too hot, and it is very desirable that we should

sweat; yet the skin is both hot and dry. There are many drugs known which prevent sweating, and some which produce sweating. The most remarkable of these comes from an African plant, and a mere fraction of a grain of it will make the skin simply run with perspiration. A still smaller dose of another drug which comes from the plant called the deadly nightshade will prevent all sweating for many hours. In both cases these doses are so small that they could not possibly act as they do if they had to be spread over all the sweat-glands. But they act on the tiny sweat-centre in the brain, and that is why so little of them can produce such powerful results. A little whisper in the king's ear may do more than much shouting in the streets!

Something should be said of a few other important facts about the skin. It is one of the great organs of sense, or feeling. We are rather apt to confuse the various kinds of sensation that our skin gives us, as if they were all varieties of the same thing, but they are not. There is, first of all, the pressure sense, or sense of touch. This is quite different from the sense of pain or of temperature.

THE WONDERFUL LITTLE STRUCTURE THAT GIVES US THE SENSE OF TOUCH

If we examine the true skin, especially in the tips of the fingers and toes, we find special structures in it which are there for the purpose of touch. Nerves run to them, and the ends of the nerves spread out within them. Now, wherever these little touch-bodies, as they are called, are most numerous, there our sense of touch is most delicate, and that is why so many of them are found in the tips of the fingers, which must be very sensitive. Many are found also in the skin of the lips, and they occur also in the tip of the tongue. Two points can be felt as two by the skin of the forefinger when they are very close together, but if the distance between them is increased by twenty times, we can only feel them as one when they are applied to the skin of the back. The skin of the forehead and of the palm of the hand will feel the lightest weight, while the skin of the chin requires the weight to be twenty times as heavy before it can be felt.

The sense of heat and cold is quite distinct from the sense of touch, and has a quite special set of nerves for itself. If you take a cold thing, like the tip of a lead pencil, and pass it over your cheek, you

will find that it feels colder at some spots than at others, and the same is true of anything hot. The skin seems to be made up of a host of little spots—pressure spots sensitive to pressure or touch, cold spots sensitive to cold and not feeling heat at all, and hot spots that are sensitive to heat and do not feel cold at all.

Finally, there is the pain sense. Different parts of the body are differently sensitive to pain, and the skin is far more sensitive in general than the inside of the body. The pain sense has a special set of nerves, and in people who have something the matter with these nerves, so that the nerves cannot act, the skin of the hand will appreciate heat and cold and touch, but pins can be run into it, or it can be pinched, without feeling pain at all.

So we must think of the skin as the organ for three senses—pressure, temperature and pain. People often say we have five senses, but, as a matter of fact, we have far more, and three must be put down to the credit of the skin alone.

HOW THE SKIN MAY HELP US TO KNOW THE POSITION OF OUR BODY

Probably, too, we are helped to know the position of our body—where our hands and feet are, and so on—by the stretching of the skin in one part, or loosening of it in another part, which helps the brain to know where the different parts of the body are. So, in addition to everything else it does, the skin contributes to our sense of position—one of the senses which few people have ever heard about.

In many parts of the body are special cells in the skin, with power of making certain outgrowths of skin. Our skin does not produce so many of these as does the skin of many animals, but at any rate it produces two kinds of outgrowth—hair and nails. Our nails are very interesting, for they correspond to the claws of a cat, and to the hoofs of a horse.

For many creatures these outgrowths of the skin at the ends of their fingers and toes are extremely important. Perhaps they catch their prey by them, or walk upon them, or climb by them. But for us they have lost their importance. Still, our nails remain, though they are too weak and thin to be of much use.

They grow from below, and can be completely removed without destroying the cells which make them. If you play ball, or even if you do not, you may have had a nail banged. If it is banged hard,

it turns blue. That means that a blood-vessel has been injured, and there has been some bleeding under the nail. A new nail gradually grows, and in time the old nail comes off. But if damage had been done to the special cells which have the power of making the nail, no new nail could ever be formed again.

THE SKIN THAT CAN NEVER BE FORMED AGAIN

Hair is another thing our skin produces. The part of the hair showing above the skin is made of much the same kind of material as the epidermis, or outer skin, which is also very much the same as the material that the nails are made of.

Each hair grows from a special place in the true skin. If the true skin is destroyed a scar forms, and we may feel all right; but nothing can ever form true skin again. A scar is not skin. There are never any hairs to be found growing from a scar, and when the rest of the body is dripping with sweat, a scar will be perfectly dry, for it has no sweat-glands in it.

The places from which the hairs grow are very complicated and beautifully made. Every hair really consists of six layers, all of which are made by the cells of the little hair-bulb from which the hair grows. But each hair requires to be looked after, or it will become brittle. So there are special glands—usually two to each hair—which produce a kind of oil that keeps the hair soft and pliable, and prevents it from cracking. Also every hair has a muscle which is attached to its root, and when this tiny little muscle contracts, it pulls on the hair and makes it stand upright. So when we read stories of people whose hair stood on end, it is quite possible that that really might happen, though it is not common.

HOW THE CAT MAKES ITS HAIR STAND ON END TO FRIGHTEN ITS ENEMIES

We rarely use these little muscles, and no one can use them by his own will. Like the hairs themselves, they are relics from the past. A cat has them, and everyone who keeps a cat has seen its hair stand on end. A possible use of this is that it may help to clean the skin. But there is a more likely explanation still. When an animal like a cat makes all its hair stand on end, the cat looks much bigger and more alarming than when its hair lies flat. It is probable that this is of use to animals in helping them to frighten their enemies.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 1559.

ADVENTURES OF BARON MUNCHAUSEN

THIS amusing book appeared in England in the year 1785 and was a satire, that is, a book which made fun of the tales of men who had written extravagantly of their travels in distant parts of the world. Travelers had come home from journeys to almost unknown lands and had told stories of marvelous things they had seen and done. Listeners and readers were startled by these strange tales which they thought could not be true. Rudolf Raspe, a German scholar who was clever but not very honest, had taken refuge in England to escape punishment for some wrongdoing in Germany. He was very poor, and to make some money he wrote his little book. It became popular at once because the adventures of Baron Munchausen were so ridiculous that they made people laugh. As the years went by, other unknown authors added to the book, until it became a volume of some size. It has been translated into almost every language and has given enjoyment to millions of people. And the word Munchausen has been adopted into everyday speech to mean a person who "draws a long bow," that is, one who stretches the truth. Here we give, word for word as they were written, some of the tales supposed to have been told by Baron Munchausen.

THE LION AND THE CROCODILE

SOME years before my beard announced approaching manhood, or, in other words, when I was neither man nor boy, but between both, I expressed in repeated conversations a strong desire of seeing the world, from which I was discouraged by my parents, though my father had been no inconsiderable traveller himself, as will appear before I have reached the end of my singular and, I may add, interesting adventures. A cousin, by my mother's side, took a liking to me, often said I was a fine forward youth, and was much inclined to gratify my curiosity. His eloquence had more effect than mine, for my father consented to my accompanying him in a voyage to the island of Ceylon, where his uncle had resided as governor many years.

We sailed from Amsterdam with despatches from their High Mightinesses the States of Holland. The only circumstance which happened on our voyage worth relating was the wonderful effects of a storm, which had torn up by the roots a great number of trees of enormous bulk and height, in an island where we lay at anchor to take in wood and water; some of these trees weighed many tons, yet they were carried by the wind so amazingly high, that they appeared like the feathers of small birds floating in the



air, for they were at least five miles above the earth: however, as soon as

the storm subsided they all fell perpendicularly into their respective places, and took root again, except the largest, which happened, when it was blown into the air, to have a man and his wife, a very honest old couple, upon its branches, gathering cucumbers (in this part of the globe that useful vegetable grows upon trees): the weight of this couple, as the tree descended, over-balanced the trunk, and brought it down in a horizontal position: it fell upon the chief man of the island, and killed him on the spot; he had quitted his house in the storm, under an apprehension of its falling upon him, and was returning through his own garden when this fortunate accident happened. The word fortunate, here, requires some explanation. This chief was a man of a very avaricious and oppressive disposition, and though he had no family, the natives of the island were half-starved by his oppressive and infamous impositions.

The very goods which he had thus taken from them were spoiling in his stores, while the poor wretches from whom they were plundered were pining in poverty. Though the destruction of this tyrant was accidental, the people chose the cucumber-gatherers

for their governors, as a mark of their gratitude for destroying, though accidentally, their late tyrant.

After we had repaired the damages we sustained in this remarkable storm, and taken leave of the new governor and his lady, we sailed with a fair wind for the object of our voyage.

In about six weeks we arrived at Ceylon, where we were received with great marks of friendship and true politeness. The following singular adventures may not prove unentertaining.

After we had resided at Ceylon about a fortnight I accompanied one of the governor's brothers upon a shooting party. He was a strong, athletic man, and being used to that climate (for he had resided there some years), he bore the violent heat of the sun much better than I could; in our excursion he had made a considerable progress through a thick wood when I was only at the entrance.

Near the banks of a large piece of water, which had engaged my attention, I thought I heard a rustling noise behind; on turning about I was almost petrified (as who would not be?) at the sight of a lion, which was evidently approaching with the intention of satisfying his appetite with my poor carcase, and that without asking my consent. What was to be done in this horrible dilemma? I had not even a moment for reflection; my piece was only charged with swan-shot, and I had no other about me; however, though I could have no idea of killing such an animal with that weak kind of ammunition, yet I had some hopes of frightening him by the report, and perhaps of wounding him also. I immediately let fly, without waiting till he was within reach, and the report did but enrage him, for he now quickened his pace, and seemed to approach me full speed: I attempted to escape, but that only added (if an addition could be made) to my distress; for the moment I turned about I found a large crocodile, with his

mouth extended almost ready to receive me. On my right hand was the piece of water before mentioned, and on my left a deep precipice, said to have, as I have since learned, a receptacle at the bottom for venomous creatures; in short, I gave myself up as lost, for the lion was now upon his hind legs, just in the act of seizing me; I fell involuntarily to the ground with fear, and, as it afterwards appeared, he sprang over me. I lay some time in a situation which no language can describe, expecting to feel his teeth or talons in some part of me every moment: after waiting in this prostrate situation a few seconds I heard a violent but unusual noise, different from any sound that had ever before assailed my ears; nor is it at all to be wondered at, when I inform you from whence it proceeded: after listening for some time, I ventured to raise my head and look round, when, to my unspeakable joy, I perceived the lion had, by the eagerness with which he sprung at me, jumped forward as I fell, into the crocodile's mouth! which, as before observed, was wide open; the head of the one stuck in the throat of the other! and they were struggling to extricate themselves! I fortunately recollected my *couteau de chasse*, which was by my side; with this instrument I severed the lion's head at one blow, and the body fell at my feet! I then, with the butt-end of my fowling piece, rammed the head farther into the throat of the crocodile, and destroyed him by suffocation, for he could neither gorge nor eject it.

Soon after I had thus gained a complete victory over my two powerful adversaries my companion arrived in search of me; for finding I did not follow him into the wood, he returned, apprehending I had lost my way, or met with some accident.

After mutual congratulations, we measured the crocodile, which was just forty feet in length. The skin was stuffed and sent to the Amsterdam museum.

THE BARON RESCUES HIS HORSE

I SET off from Rome on a journey to Russia, in the midst of winter, from a just notion that frost and snow must of course mend the roads, which every traveller had described as uncommonly bad through the northern parts of Germany, Poland, Courland and Livonia. I

went on horseback, as the most convenient manner of travelling; I was but lightly clothed, and of this I felt the inconvenience the more I advanced north-east. What must not a poor old man have suffered in that severe weather and climate, whom I saw on a bleak common

in Poland, lying on the road, helpless, shivering and hardly having wherewithal to cover his nakedness? I pitied the poor soul: though I felt the severity of the air myself, I threw my mantle over him, and immediately I heard a voice from the heavens, blessing me for that piece of charity, saying,

"You will be rewarded, my son, for this in time."

I went on: night and darkness overtook me. No village was to be seen. The country was covered with snow, and I was unacquainted with the road.

Tired, I alighted, and fastened my horse to something like a pointed stump of a tree, which appeared above the snow; for the sake of safety I placed my pistols under my arm, and laid down on the snow, where I slept so soundly that I did not open my eyes till full daylight. It is not easy to conceive my astonishment

to find myself in the midst of a village, lying in a churchyard; nor was my horse to be seen, but I heard him soon after neigh somewhere above me. On looking upwards I beheld him hanging by his bridle to the weather-cock of the steeple. Matters were now very plain to me: the village had been covered with snow overnight; a sudden change of weather had taken place; I had sunk down to the churchyard whilst asleep, gently, and in the same proportion as the snow had melted away; and what in the dark I had taken to be a stump of a little tree appearing above the snow, to which I had tied my horse, proved to have been the cross or weather-cock of the steeple!

Without long consideration I took one of my pistols, shot the bridle in two, brought down the horse, and proceeded on my journey. My horse felt absolutely no ill-effects from his experience.

A STAG WITH A CHERRY TREE

I DARE say you have heard of the hunter and sportsman's saint and protector, St. Hubert, and of the noble stag, which appeared to him in the forest, with the holy cross between his antlers. I have paid my homage to that saint every year in good fellowship, and seen this stag a thousand times either painted in churches, or embroidered in the stars of his knights; so that, upon the honor and conscience of a good sportsman, I hardly know whether there may not have been formerly, or whether there are not such crossed stags even at this present day. But let me rather tell what I have seen myself. Having one day spent all my shot, I found myself unexpectedly in presence of a stately stag, looking at me as unconcernedly as if he had known of

my empty pouches. I charged immediately with powder, and upon it a good handful of cherry-stones, for I had sucked the fruit as far as the hurry would permit. Thus I let fly at him, and hit him just on the middle of the forehead, between his antlers; it stunned him—he staggered—yet he made off. A year or two after, being with a party in the same forest, I beheld a noble stag with a fine full-grown cherry-tree above ten feet high between his antlers. I immediately recollected my former adventure, looked upon him as my property, and brought him to the ground by one shot, which at once gave me the haunch and cherry-sauce; for the tree was covered with the richest fruit, the like I had never tasted before.

THE WONDERFUL HUNTING DOG

I N a voyage which I made to the East Indies with Captain Hamilton, I took a favorite pointer with me; he was, to use a common phrase, worth his weight in gold, for he never deceived me. One day when we were, by the best observations we could make, at least three hundred leagues from land, my dog pointed; I observed him for near an hour with astonishment, and mentioned the circumstance to the captain and every officer on board, asserting that we must be near land, for my dog smelt game. This occa-

sioned a general laugh; but that did not alter in the least the good opinion I had of my dog. After much conversation pro and con, I boldly told the captain I placed more confidence in Tray's nose than I did in the eyes of every seaman on board, and therefore proposed laying the sum I had agreed to pay for my passage (viz., one hundred guineas) that we should find game within half an hour. The captain (a good, hearty fellow) laughed again, desired Mr. Crowford, the surgeon, who was prepared, to feel my

pulse; he did so, and reported me in perfect health. The following dialogue between them took place; I overheard it, though spoken low, and at some distance.

Captain.—His brain is turned; I cannot with honor accept his wager.

Surgeon.—I am of a different opinion; he is quite sane, and depends more upon the scent of his dog than he will upon the judgment of all the officers on board; he will certainly lose, and he richly merits it.

Captain.—Such a wager cannot be fair on my side; however, I'll take him up, if I return his money afterwards.

During the above conversation Tray continued in the same situation, and confirmed me still more in my former opinion. I proposed the wager a second time, it was then accepted.

Done! and done! were scarcely said on both sides, when some sailors who were fishing in the long-boat, which was made fast to the stern of the ship, harpooned an exceeding large shark, which

they brought on board and began to cut up for the purpose of barrelling the oil, when, behold, they found no less than *six brace of live partridges* in this animal's stomach!

They had been so long in that situation, that one of the hens was sitting upon four eggs, and a fifth was hatching when the shark was opened!!! This young bird we brought up by placing it with a litter of kittens that came into the world a few minutes before! The old cat was as fond of it as of any of her own four-legged progeny, and made herself very unhappy, when it flew out of her reach, till it returned again. As to the other partridges, there were four hens amongst them; one or more were, during the voyage, constantly sitting, and consequently we had plenty of game at the captain's table; and in gratitude to poor Tray (for being a means of winning one hundred guineas) I ordered him the bones daily, and sometimes a whole bird. And, indeed, he well deserved such a reward.

A WORLD TOUR BY EAGLE

ABOUT the beginning of his present Majesty's reign I had some business with a distant relation who then lived on the Isle of Thanet; it was a family dispute, and not likely to be finished soon. I made it a practice during my residence there, the weather being fine, to walk out every morning. After a few of these excursions I observed an object upon a great eminence about three miles distant: I extended my walk to it, and found the ruins of an ancient temple: I approached it with admiration and astonishment; the traces of grandeur and magnificence which yet remained were evident proofs of its former splendor: here I could not help lamenting the ravages and devastations of time, of which that once noble structure exhibited such a melancholy proof. I walked round it several times, meditating on the fleeting and transitory nature of all terrestrial things; on the eastern end were the remains of a lofty tower, near forty feet high, overgrown with ivy, the top apparently flat; I surveyed it on every side very minutely, thinking that if I could gain its summit I should enjoy the most delightful prospect of the circumjacent country. Animated with this hope, I resolved, if possible, to gain the summit, which I at length effected by means of the ivy, though not without

great difficulty and danger; the top I found covered with this evergreen, except a large chasm in the middle. After I had surveyed with pleasing wonder the beauties of art and nature that conspired to enrich the scene, curiosity prompted me to sound the opening in the middle, in order to ascertain its depth, as I entertained a suspicion that it might probably communicate with some unexplored subterranean cavern in the hill; but having no line I was at a loss how to proceed. After revolving the matter in my thoughts for some time, I resolved to drop a stone down and listen to the echo; having found one that answered my purpose, I placed myself over the hole, with one foot on each side, and stooping down to listen, I dropped the stone, which I had no sooner done than I heard a rustling below, and suddenly a monstrous eagle put up its head right opposite my face, and rising up with irresistible force, carried me away seated on its shoulders: I instantly grasped it around the neck, which was large enough to fill my arms, and its wings, when extended, were ten yards from one extremity to the other. As it rose with a regular ascent, my seat was perfectly easy, and I enjoyed the prospect below with inexpressible pleasure. It hovered over Margate for some time,

was seen by several people, and many shots were fired at it; one ball hit the heel of my shoe, but did me no injury. It then directed its course to Dover cliff, where it alighted, and I thought of dismounting, but was prevented by a sudden discharge of musketry from a party of marines that were exercising on the beach; the balls flew about my head, and rattled on the feathers of the eagle like hail-stones, yet I could not perceive it had received any injury. It instantly reascended and flew over the sea towards Calais, but so very high that the Channel seemed to be no broader than the Thames at London Bridge. In a quarter of an hour I found myself over a thick wood in France, where the eagle descended very rapidly, which caused me to slip down to the back part of its head; but alighting on a large tree, and raising its head, I recovered my seat as before, but saw no possibility of disengaging myself without the danger of being killed by the fall; so I determined to sit fast, thinking it would carry me to the Alps, or some other high mountain, where I could dismount without any danger. After resting a few minutes it took wing, flew several times round the wood, and screamed loud enough to be heard across the English Channel. In a few minutes one of the same species arose out of the wood, and flew directly towards us; it surveyed me with evident marks of displeasure, and came very near me. After flying several times round, they both directed their course to the south-west. I soon observed that the one I rode upon could not keep pace with the other, but inclined towards the earth, on account of my weight; its companion perceiving this, turned round and placed itself in such a position that the other could rest its head on its rump; in this manner they proceeded till noon, when I saw the rock of Gibraltar very distinctly. The day being clear, notwithstanding my degree of elevation, the earth's surface appeared just like a map, where land, sea, lakes, rivers, mountains, and the like were perfectly distinguishable; and having some knowledge of geography, I was at no loss to determine what part of the globe I was in.

Whilst I was contemplating this wonderful prospect a dreadful howling suddenly began all around me, and in a moment I was invested by thousands of small black, deformed, frightful-looking

creatures, who pressed me on all sides in such a manner that I could neither move hand nor foot: but I had not been in their possession more than ten minutes when I heard the most delightful music that can possibly be imagined, which was suddenly changed into a noise the most awful and tremendous, to which the report of cannon, or the loudest claps of thunder could bear no more proportion than the gentle zephyrs of the evening to the most dreadful hurricane; but the shortness of its duration prevented all those fatal effects which a prolongation of it would certainly have been attended with.

The music commenced, and I saw a great number of the most beautiful little creatures seize the other party, and throw them with great violence into something like a snuff-box, which they shut down, and one threw it away with incredible velocity; then turning to me, he said they whom he had secured were a party of devils, who had wandered from their proper habitation; and that the vehicle in which they were enclosed would fly with unabating rapidity for ten thousand years, when it would burst of its own accord, and the devils would recover their liberty and faculties, as at the present moment. He had no sooner finished this relation than the music ceased, and they all disappeared, leaving me in a state of mind bordering on the confines of despair.

When I had recomposed myself a little, and looking before me with inexpressible pleasure, I observed that the eagles were preparing to light on the peak of Teneriffe: they descended to the top of a rock, but seeing no possible means of escape if I dismounted determined me to remain where I was. The eagles sat down seemingly fatigued, when the heat of the sun soon caused them both to fall asleep, nor did I long resist its fascinating power. In the cool of the evening, when the sun had retired below the horizon, I was roused from sleep by the eagle moving under me; and having stretched myself along its back, I sat up, and reassumed my travelling position, when they both took wing, and having placed themselves as before, directed their course to South America. The moon shining bright during the whole night, I had a fine view of all the islands in those seas.

About the break of day we reached the great continent of America, that part called Terra Firma, and descended on the

top of a very high mountain. At this time the moon, far distant in the west, and obscured by dark clouds, but just afforded light sufficient for me to discover a kind of shrubbery all around, bearing fruit something like cabbages, which the eagles began to feed on very eagerly. I endeavored to discover my situation, but fogs and passing clouds involved me in the thickest darkness, and what rendered the scene still more shocking was the tremendous howling of wild beasts, some of which appeared to be very near: however, I determined to keep my seat, imagining that the eagle would carry me away if any of them should make a hostile attempt. When daylight began to appear I thought of examining the fruit which I had seen the eagles eat, and as some was hanging which I could easily come at, I took out my knife and cut a slice; but how great was my surprise to see that it had all the appearance of roast beef regularly mixed, both fat and lean! I tasted it, and found it well flavored and delicious, then cut several large slices and put in my pocket, where I found a crust of bread which I had brought from Margate; took it out, and found three musket-balls that had been lodged in it on Dover cliff. I extracted them, and cutting a few slices more, made a hearty meal of bread and cold beef fruit. I then cut down two of the largest that grew near me, and tying them together with one of my garters, hung them over the eagle's neck for another occasion, filling my pockets at the same time. While I was settling these affairs I observed a large fruit like an inflated bladder, which I wished to try an experiment upon: and striking my knife into one of them, a fine pure liquor like Hollands gin rushed out, which the eagles observing, eagerly drank up from the ground. I cut down the bladder as fast as I could, and saved about half a pint in the bottom of it, which I tasted, and could not distinguish it from the best mountain wine. I drank it all, and found myself greatly refreshed. By this time the eagles began to stagger against the shrubs. I endeavored to keep my seat, but was soon thrown to some distance among the bushes. In attempting to rise I put my hand upon a large hedgehog, which happened to lie among the grass upon its back: it instantly closed round my hand, so that I found it impossible to shake it off. I struck it several times

against the ground without effect; but while I was thus employed I heard a rustling among the shrubbery, and looking up, I saw a huge animal within three yards of me; I could make no defence, but held out both my hands, when it rushed upon me, and seized that on which the hedgehog was fixed. My hand being soon relieved, I ran to some distance, where I saw the creature suddenly drop down and expire with the hedgehog in its throat. When the danger was past I went to view the eagles, and found them lying on the grass fast asleep, being intoxicated with the liquor they had drank. Indeed, I found myself considerably elevated by it, and seeing everything quiet, I began to search for some more, which I soon found; and having cut down two large bladders, about a gallon each, I tied them together, and hung them over the neck of the other eagle, and the two smaller ones I tied with a cord round my own waist. Having secured a good stock of provisions, and perceiving the eagles begin to recover, I again took my seat. In half an hour they arose majestically from the place, without taking the least notice of their encumbrance. Each reassumed its former station; and directing their course to the northward, they crossed the Gulf of Mexico, entered North America, and steered directly for the Polar regions, which gave me the finest opportunity of viewing this vast continent that can possibly be imagined.

Before we entered the frigid zone the cold began to affect me; but piercing one of my bladders, I took a draught, and found that it could make no impression on me afterwards. Passing over Hudson's Bay, I saw several of the company's ships lying at anchor, and many tribes of Indians marching with their furs to market.

By this time I was so reconciled to my seat, and become such an expert rider, that I could sit up and look around me; but in general I lay along the eagle's neck, grasping it in my arms, with my hands immersed in its feathers, in order to keep them warm.

In these cold climates I observed that the eagles flew with greater rapidity, in order, I suppose, to keep their blood in circulation. In passing Baffin's Bay I saw several large Greenland-men to the eastward, and many surprising mountains of ice in those seas.

While I was surveying these wonders of nature it occurred to me that this was a good opportunity to discover the north-west passage, if any such thing existed, and not only obtain the reward offered by government, but the honor of a discovery pregnant with so many advantages to every European nation. But while my thoughts were absorbed in this pleasing reverie I was alarmed by the first eagle striking its head against a solid transparent substance, and in a moment that which I rode experienced the same fate, and both fell down seemingly dead.

Here our lives must inevitably have terminated, had not a sense of danger and the singularity of my situation, inspired me with a degree of skill and dexterity which enabled us to fall near two miles perpendicular with as little inconvenience as if we had been let down with a rope; for no sooner did I perceive the eagles strike against a frozen cloud, which is very common near the poles, than (they being close together) I laid myself along the back of the foremost and took hold of its wings to keep them extended, at the same time stretching out my legs behind to support the wings of the other. This had the desired effect, and we descended very safe on a mountain of ice, which I supposed to be about three miles above the level of the sea.

I dismounted, unloaded the eagles, opened one of the bladders and administered some of the liquor to each of them, without once considering that the horrors of destruction seemed to have conspired against me.

But suddenly a monstrous bear began to roar behind me, with a voice like thunder. I turned round, and seeing the creature just ready to devour me, having the bladder of liquor in my hands, through fear I squeezed it so hard, that it burst, and the liquor flying in the eyes of the animal, totally deprived it of sight. It instantly turned from me, ran away in a state of distraction and soon fell over a precipice of ice into the sea, where I saw it no more.

The danger being over, I again turned my attention to the eagles, whom I found in a fair way of recovery, and suspecting that they were faint for want of victuals, I took one of the beef fruit, cut it into small slices and presented them with it, which they devoured with avidity.

Having given them plenty to eat and drink, and disposed of the remainder of my provision, I took possession of my seat as before. After composing myself, and adjusting everything in the best manner, I began to eat and drink very heartily; and through the effects of the mountain, as I called it, was very cheerful, and began to sing a few verses of a song which I had learned when I was a boy: but the noise soon alarmed the eagles, who had been asleep, through the quantity of liquor which they had drank, and they arose seemingly much terrified. Happily for me, however, when I was feeding them I had accidentally turned their heads towards the south-east, which course they pursued with a rapid motion. In a few hours I saw the Western Isles, and soon after had the inexpressible pleasure of seeing Old England. I took no notice of the seas or islands over which I passed.

The eagles descended gradually as they drew near the shore, intending, as I supposed, to alight on one of the Welsh mountains; but when they came to the distance of about sixty yards two guns were fired at them, loaded with balls, one of which penetrated a bladder of liquor that hung to my waist; the other entered the breast of the foremost eagle, who fell to the ground, while that which I rode, having received no injury, flew away with amazing swiftness.

This circumstance alarmed me exceedingly, and I began to think it was impossible for me to escape with my life; but recovering a little, I once more looked down upon the earth, when, to my inexpressible joy, I saw Margate at a little distance, and the eagle descending on the old tower whence it had carried me on the morning of the day before. It no sooner came down than I threw myself off, happy to find that I was once more restored to the world. The eagle flew away in a few minutes, and I sat down to compose my fluttering spirits.

I soon paid a visit to my friends, and related these adventures. Amazement stood in every countenance; their congratulations on my returning in safety were repeated with an unaffected degree of pleasure, and we passed the evening as we are doing now, every person present paying the highest compliments to my courage and veracity.

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 1629.

FIERCE SEA-ROVERS WHO PLUNDERED ENGLAND



In the dark and bitter times which fell upon England a thousand years ago, fierce and wild tribes of men poured down upon the shores, destroying the peace of the English people, setting fire to their monasteries and churches, and plundering their cities. They were the Danes, the hardy sailors who lived in the lowlands of Denmark and Sweden and along the coast of Norway. This picture shows how the Danes, the fierce sea-rovers of the ninth century, swept down upon other lands and took possession of them.

The Book of All Countries

THE HISTORY OF ENGLAND

WE read here of the beginnings of a nation. After the Romans had gone, there came to England many tribes from across the North Sea, dividing the country into little kingdoms, and there was much fighting. The fierce Danes, too, swept down upon the land, plundering and burning. In the midst of these troubles rose up Alfred the Great, who began the navy, encouraged learning, and set the country in order. But after his death the Danes obtained power, and three Danish kings ruled in England. The English king was driven out, and his son Edward was brought up in Normandy. But the people threw off the Danes, and Edward came home. When he died, Harold was chosen king. Duke William of Normandy was angry when he heard of this, because Edward and Harold, he said, had promised him the crown. He went over and defeated Harold at Hastings, and with this coming of the Normans the building up of the nation began.

THE FOUNDING OF THE NATION

THERE were long cold winters on those flat and sandy shores round the southeast corner of the North Sea, from where the new-comers into England came. The meadows by the marshes, the dark woods behind them, could not afford enough food for the people who lived in the homesteads around; for, as time went on, more and more tribes of the same family of nations pushed nearer to the sea, till all were overcrowded.

So it came to pass each spring, "when the birds began to twitter in the sunshine, and the brooks and rivers ran gaily singing to the sea," that some of the youngest and strongest of the people set out to find new and more roomy homes, where they could hunt and fish and grow grain to feed their families.

Truly a desperate sight it must have been for the poor "guardian of the shore" in Kent or elsewhere, when the long, narrow boats with imposing figureheads came swiftly toward him. In most cases resistance was useless. The tall, strong men, with flowing hair and bronzed faces, glittering swords and shields, leaped ashore one after the other, and before long were masters of some desirable piece of land, if possible near the mouth of a river or in a sheltered bay. Then and there chiefs, such as Alfred or Clapa, or families like the Billings or the Harlings, set up their *ham*, or home, their

CONTINUED FROM 1324



ton, or town, as at Clapham and Alfreton, Billingham and Harlington. We can, by names such as these and many others—such as *wick*, meaning a village; *staple*, a store—trace their settlements along the shore, up the courses of the rivers, and across the fertile plains. These names are still in use, and are written on the maps to-day.

The maps also still show us, to some extent, where the different tribes of new-comers settled. Although they belonged to the same great family, they bore different names. The Jutes settled in the Isle of Wight and in Kent, which still keeps its name from an old British tribe. Branches of the Saxons, the South, East and Middle Saxons, made their homes in Sussex, Essex, Middlesex. There was also Wessex of the West Saxons. The Angles took up their abode in East Anglia, the country of the North and South folk—Norfolk and Suffolk; and in Lincolnshire. It was the Angles who in the end gave their name to the whole country, which became Angleland, or England.

The fighting for territory went on for a long time, but gradually the families began to feel at home in their *hams* and their allotments—for which they really cast "lots." In the commons of to-day, so glorious with golden furze and old white-thorn trees, we can tread, as they did, the piece of land

left open and "common" to those settled near it. They had "common rights," as people have now, to gather wood and bracken, and let their animals roam about.

EGBERT, THE FIRST OF THE FIFTY RULERS OF ENGLAND

For some years the country was divided up into several kingdoms, such as Kent, Wessex, Mercia, Northumbria. Often they were bitter enemies; but at last, at the beginning of the ninth century, they all acknowledged one overlord, Egbert. He has been called the first king of England. There have been more than fifty rulers since then.

The shires, or divisions into which the country is cut up, so that each part can govern its own affairs, were formed by degrees in these old times. The word *shire* comes from a word like *shears*, meaning "cut off." Sometimes the shire was one of the old kingdoms, or a part of one. Sometimes it was named after a town of importance, such as Derby-shire.

The family treasures, as we can see in the Anglo-Saxon Room at the British Museum, are dug up from all parts of these shires. In Lincolnshire a railway cut goes right through a large cemetery. On the breezy downs of the Isle of Wight many warriors were laid to rest, with their weapons and ornaments beside them. Numbers come from Kent. How beautiful those swords and knives must have looked when they were new and bright! It was the mother who gave the weapons to the lad when the time came for him to follow his father to battle or the chase, bidding him keep them till death took them from him.

THE JEWELS OF MOTHERS, NAMES OF CHILDREN, AND HYMNS OF PREACHERS

Those fine necklaces, brooches, rings, gold thread and precious stones from old embroidery, bring to mind those English mothers of long ago. One of them, in an old story told round the hearth, as we tell stories now, earned the title of "faithful peace-weaver." Could anything be better? The beautiful drinking-horns and glasses without stands carry us to the halls where the families rejoiced. The names of the children who wore those small bracelets may well have been Edith or Ethel, for these names, as well as the boys' names of Edgar, Edwin and Edward, have come down from these times.

The sculptured stone cross reminds us that missionaries came over from Ireland to preach to the wild north; others came from Rome to the south to persuade men to give up the gods of their forefathers and become Christians. There was a long, fierce struggle before they succeeded. Woden, the god of war; Thor, the god of thunder; Freya, the goddess of peace and plenty, are still recalled as we speak of Wednesday, Thursday, Friday.

A fine cross was put up a few years ago near Minster, in the Isle of Thanet, to mark the spot where Augustine, the Roman missionary, landed toward the end of the sixth century. Headed by a painted cross and waving banners, he and his clergy set out for Canterbury from here, chanting hymns and prayers as they went. This stone cross is copied from the old ones, some much larger than the one in the museum, set up in Ireland and the north by the missionaries of old to remind their hearers of the Gospel story after they had passed away. Many of these are still to be seen.

EDWIN, THE GREAT KING WHO FOUNDED EDINBURGH, OR EDWIN'S TOWN

The pillow-stones which were found under the heads of nuns make one think of the numbers of women, as well as men, who were often thankful to retire, in those rough times, to the quiet of a religious house, to read and write, to think and pray.

Edwin was one of the greatest of the first Christian kings. It was he who founded Edinburgh—Edwin's "burgh," or town. He needed a strong fort to protect the fertile lands to the south of the Forth—the Lothians of to-day—and to hold the roads from the north. The castle rock between the hills and the sea gave the needed protection to the town which grew up round its base.

About this time arose the first English poet, from a religious house or monastery on the cliffs above Whitby, in Yorkshire, to which he had retired when his great gift of song was discovered.

On the same coast, a little farther north, where now is heard the great noise of iron shipbuilding, there lived and died the great scholar and writer Bede, often called the Venerable Bede. He spent his whole life learning and teaching, and translating and writing books for the pupils who gathered round him. His

LONG AGO IN THE OLD COUNTRY



Lord Leighton's picture of the Ancient Britons trading with the Phoenicians.



The first preaching of Christianity in Great Britain—From the painting by J. R. Herbert, R.A.

chief work, perhaps, is the history of the Church of the country, which has gained him the title of the first English historian.

THE BOOK OF THE OLD SCHOLAR BEDE,
AND THE STORY IT TELLS

There is still a copy of Bede's book to be seen, written in Latin, in one of the most precious cases in the British Museum—the eight-sided one, which contains the manuscripts from which we learn the earliest English history. Bede's book is open at the page which tells the old story of how Augustine was sent to preach to the English. The handsome, fair, blue-eyed boys being sold for slaves in the market at Rome, attracted the pity of a young monk, afterward Pope Gregory. He made a joke on their name when it was told him. "Not Angles, but Angels," he said; "they are so beautiful." As soon as he had the power he sent Augustine and a band of missionaries to carry Christianity into the boys' country.

Many another story does Bede tell. He sent all over the country to gather all the information he could, and as one reads the account of his gentle ways and his hard work to the very end of his life, one feels a great love for the saintly man.

But once more dark and bitter times fell upon the land, and learning and peace were again destroyed. Hardly had Egbert of Wessex made himself overlord of the country from the Forth to the Channel, at the beginning of the ninth century, when sea-rovers poured into it.

HOW THE FURIOUS DANES CAME DOWN
UPON ENGLAND

They were even more fierce and wild than the English tribes had been three centuries before. They, too, came in fine boats, often blazing with color, sometimes black as night, with high, carved figureheads, and the dreaded Raven banner at the mast. They came across the North Sea, like the Jutes and Saxons and Angles. Their homes were in the lowlands of Denmark, in Sweden and along the jagged coast of Norway. All were of the same stock—Danes; North, or Norse, men; Vikings, or men of the creeks. "From the fury of the Northmen, good Lord deliver us!" was the prayer of the Christians they attacked. All the Northmen particularly hated and despised the religion which had taken

the place of the old one to which they fiercely clung. So, over the stricken land flames went up from the monasteries and churches, and those who had sought refuge in them were slain. Think of it! Cædmon's haven of rest at Whitby was not spared, nor Bede's at Yarrow, nor the beautiful abbey on the little island of Lindisfarne, where Columba and Aidan, missionaries from the West, had lived. London was burned and the whole country plundered.

In the midst of all this, toward the end of the ninth century, there arose one of the noblest of the English kings, Alfred the Great, the Truth-teller, the Wise. His titles and the very stories about his good nature, bravery and industry which have been handed down to our times show how beloved he was by his subjects—a thousand years ago. When he first became king, the Danes were quiet for a while, and he made good use of this peaceful time to build ships to prevent the sea-rovers' landing. This was the beginning of the British navy. He also did his best to get the country into order, and soldiers trained to fight.

THE STORY OF THE TROUBLED LIFE
OF KING ALFRED THE GREAT

For a time after the return of the Danes things went against Alfred, and he had to hide. It is said that he hid one day in a swineherd's cottage where the swineherd's wife was making cakes. Not knowing the king, she let him sit by the hearth mending his bow and arrow if he would promise to see that the cakes did not burn while she was out. By the blazing red fire on the hearth sat the young king, deep in anxious thought—so deep in thought that he did not notice the strong smell of the cakes as they burned to cinders. It was rather provoking for the housewife, and, not knowing to whom she was speaking, she scolded the king for letting her cakes burn.

Another story from this time is of his venturing alone, disguised as a singer, into the Danish camp night after night, to find out their plans. Soon after this he won a great victory, and the treaty, or arrangement, which followed gave peace for many years. In his wisdom he saw that the country would be ruined unless fighting could be stopped; and though he was quite a young man, he gave up any hopes he may well have had

ALFRED LEADS HIS PEOPLE & HIDES FROM HIS FOES



ALFRED APPEALING TO THE PEOPLE TO DRIVE THE DANES OUT OF ENGLAND



THE ANGRY HOUSEWIFE SCOLDING THE UNKNOWN KING FOR LETTING HER CAKES BURN

In the midst of the misery and trouble caused by the fighting Danes, there rose one of the noblest of the English kings, Alfred the Great. But he had a troubled life, and at times had to hide from his enemies, once in a swineherd's cottage. The housewife let him mend his bow by the fire if he would promise to see that her cakes did not burn. But Alfred was too deep in thought to notice the cakes, and was scolded by the housewife, who did not know to whom she was speaking, and was angry to find her cakes cinders.

of getting all the country for himself, and arranged to share it with the Danes. The part which the Danes had was called the Danelaw, because there the people lived under Danish, not Saxon, laws. Part of the boundary was the old Roman road which ran through London to Chester, called Watling Street. To-day it forms the route of a famous railroad connecting London with Wales and the Northwest.

HOW ALFRED HELPED THE PEOPLE TO MAKE THE NATION GREAT

It was not long before Alfred made his half kingdom stronger than the whole one had been before his time. He improved his army and built up forts. Then he turned his mind to making good laws with the advice of the assembly of wise men who helped him to rule the country, somewhat in the way that the Parliament helps sovereigns to rule now. Next he did all he could to teach his people. Since the Danes had destroyed the monasteries there was great ignorance everywhere, for the monasteries had been really schools in which people learned to read and write English, and Latin, which was so necessary in those times.

So Alfred called together learned men from other countries—they all understood Latin—and they wrote and translated and taught as hard as they could. Alfred himself worked with them. When he was a boy he had won a beautiful book as a prize for learning to read, and he continued to study all his life. Some think that he started the first history of England in English, called the Anglo-Saxon Chronicle. There is a copy of it in the British Museum, where there is also a famous jewel, with the words written on it "Alfred had me made." He had all the information collected that could be found about older times than his, and then added the story of his reign.

ENGLAND AFTER ALFRED'S DEATH, AND THE SPREAD OF CHRISTIANITY

After his death more was added to this, giving the history of the years as they passed for nearly three centuries. Alfred's work was carried on by his son and a very brave daughter and three grandsons, and for a time it seemed as if the Danes were going to settle down as part of the English nation without further trouble. We can to-day see on our map where they settled by the place-

names. Where the English said *tun* or *ton* for town, the Danes said *by*, and so we get Whitby, Derby, and Appleby. Many other parts of names are Danish too, such as *toft*, meaning an enclosure, as in Lowestoft; *scar*, a cliff, as in Scarborough. The long Danish swords remind us of the way in which they swung them round in battle; and the combs recall the flowing hair for which they were so famous.

In a corner of the Anglo-Saxon Room at the British Museum are some relics which take us across the Irish Channel, to the land of those missionaries we saw preaching in the north of England. As we have already seen, when Christianity was preached to the Britons in the time of the Romans, the new faith spread to Ireland, and flourished there exceedingly after the heathen Angles and Saxons had stamped it out in Britain. Churches and monasteries were built everywhere—as the number of beautiful ruins in Ireland testify to this day—and many people crowded into them, as they were the only refuges in those rough times.

THE PATIENT WORK OF THE MONKS AND THE MISSIONARIES

The country was divided into separate kingdoms, as it was in England before Egbert. Fierce fighting went on among them for many a long day. What a contrast there is between this state of things and the peace of the monasteries, in which were gathered learned men from all parts! The fame of the beautifully painted manuscripts from these monasteries spread abroad, and other arts that filled up the long days were working in metal and ivory and stone.

The missionaries who poured over the narrow straits near the Giants' Causeway, as the wild tribes of the Scots had done before them, found as beautiful a country as the one they had left in the Western Highlands, but it was wild and waste land they had often to pass over in Northumbria.

You will remember that Roman Britain stretched as far north as Agricola's forts between the firths of the Forth and Clyde, and that later the kingdom of Northumbria, under Edwin, the founder of Edinburgh, also reached as far. The tribes that for long had fought together north of this were united at last under a king called Kenneth, in the first part of the tenth century.

THE COMING OF WILLIAM THE CONQUEROR



THE FIRST MEETING OF HAROLD AND DUKE WILLIAM OF NORMANDY



HAROLD PROMISES THE CROWN TO WILLIAM, SWEARING TO BE TRUE TO HIM



THE CROWNING OF HAROLD AS KING, AFTER THE DEATH OF EDWARD THE CONFESSOR



DUKE WILLIAM OF NORMANDY, WHILE HUNTING, RECEIVES NEWS OF HAROLD'S CORONATION

When Edward the Confessor died, in January, 1066, and was buried in Westminster Abbey, Harold was chosen king of England. When Duke William of Normandy heard this, as he was hunting at Rouen, he was angry, and said that both Edward and Harold had promised him the kingdom—which nobody could really promise, because it was the people's right to choose their king. William came over to England with an army and a fleet, and a great battle was fought at Hastings, where Harold was killed and the bravest men of England fell around him. William had conquered, and new times began for England.

Scotland, too, in his time, also before and after, suffered much from the Northmen, who poured out of their creeks, called fiords, to the creeks or firths of Scotland. Right round the coast they went, taking the Shetlands, the Orkneys, and Hebrides, the rocky head of Scotland north of Glenmore, on their way down to the Isle of Man. Many traces of their rule in language, laws and customs, remain to this day.

EDGAR THE PEACEFUL KING, ETHELRED THE UNREADY, AND CANUTE THE DANE

The name of Edgar stands out in the same century as Kenneth's. He was called the Peaceful King, which shows that he lived on good terms with his neighbors, even though the story about six kings rowing him on the river Dee may not be true.

In the time of his son, Ethelred, called the Unready because he would take no man's "rede," or counsel, fresh bands of Danes appeared in England. Ethelred, at his wits' end, paid them money to go away, which they did; but they soon came back again for more. Matters became worse and worse, and so Ethelred fled away over the Channel to Normandy to his wife's relatives. And so Canute, the Danish king, who also ruled Norway, added England to his empire.

Canute proved to be a good king, and the country settled down for a time in peace. It was he who gave up to the Scottish king the land between the Forth and the Cheviots. For many centuries these hills remained the border between the two countries, with a wide road on the east by Berwick-on-Tweed, and a narrow one on the west by the marshy ground near Carlisle. Along these roads the east and west railway routes to the north pass to-day.

THE SMALL BEGINNINGS OF NORMAN INFLUENCE IN ENGLAND

Now, when bands of Northmen were plundering and wasting England and Scotland, others went to the northern shores of what is now France, then the land of the Franks—formerly Cæsar's Gaul—and settled there in the reign of Alfred. They gained the whole of the beautiful province called after them—Normandy, the land of the Northmen. They very soon left off speaking their own language, and learned that of the Franks, which we call Norman-French.

These men were bold and very fierce,

and they determined to take and keep all that came in their way. Their rulers were called Dukes. Emma, the wife of Ethelred the Unready, was the daughter of one called Richard the Fearless. Her son, Edward, was brought up in Normandy, after the family fled from England on account of the Danes, and as he grew up in a monastery he cared more for a quiet, learned life, and for attending services in church, than for fighting or looking after business. The times were too rough for such a king.

So when the English had had enough of Danish kings—there were only three of them—and Edward was called back to be king, he was not at all fitted to take part in the stirring, anxious times in his fatherland, and caused much discontent by favoring the Normans he brought with him.

EDWARD THE CONFESSOR, THE GENTLE KING WHO BUILT WESTMINSTER ABBEY

A very strong English nobleman, Earl Godwin, kept him for a time in some measure to his duty. Edward's greatest pleasure was in building churches, and the most beautiful one of all was that of the Abbey at Westminster, built after the pattern of those he knew and loved so well in Normandy, with rounded windows and arches. This abbey church at Westminster has been entirely rebuilt by later kings.

It is said that Edward promised his cousin, William of Normandy, that he should be king of England at his death; in any case William determined that king of England he would be. The gentle, white-haired, rosy-faced king—the Confessor, as he was afterward called—died in January, 1066. He was buried in his fine new church, finished only a few days before. Later a beautiful tomb was raised over him, which we can see to-day in its present place in the heart of the Abbey.

Now, the year 1066, which opened thus, was an important year for England, full of stirring history. The day after the weeping people had crowded the Abbey to see the funeral of Edward they came back again to crown the successor whom they had chosen—Harold, the son of Earl Godwin, whom they knew to be brave and wise, and a hater of the Normans.

And so, on that bright, sunny day in the keen north wind of January, the

WHAT THE SAXONS LEFT BEHIND



A beautiful brooch found in Kent.



Saxon Cross at Hexham.



Portrait of King Alfred.



St. Martin's Cross and ruins on Iona Island.



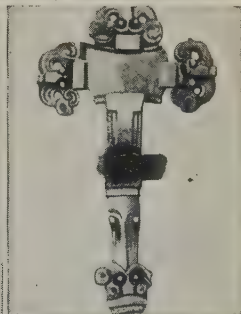
The fine old Saxon church at Bradford-on-Avon.



A buckle found in Kent.



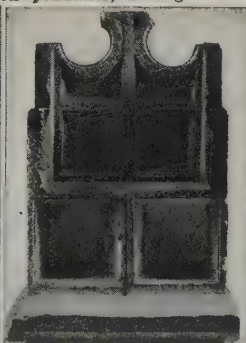
Anglo-Saxon pendants, a ring and a necklace.



A brooch buckle.



The Seat of Sanctuary in Hexham Abbey.



St. Augustine's Chair in Canterbury Cathedral.



The old Saxon tower of the church at Earls Barton.

Photos Gibson & Son, Hexham, Photochrom, Valentine, E. C. Youens.

THE CONQUEROR'S CORONATION & DEATH



When William the Conqueror reached London, after defeating Harold at Hastings, he was crowned king of England in Westminster Abbey. A great riot immediately followed, owing to the Norman troops outside, who when they heard the shouts of the people in the Abbey, thought that the new king was being attacked.



William had been twenty years in England when he had to visit Normandy, which had been invaded by French barons. As he was riding down a steep street in Mantes, his horse threw him. He was carried to Rouen seriously injured, and died in a monastery. At his death his servants robbed him and fled.

roof rang again with joyful shouts of "yea!" when the old archbishop asked if they would have Harold for king.

WILLIAM OF NORMANDY COMES TO ENGLAND IN A GREAT TEMPER

When William heard that Harold had become king after Edward, he was furious, and at once set to work to get an army and a fleet together to invade England and secure the crown he longed for. He said Harold had promised him the kingdom as well as Edward; but no one could really promise this, because it was the people's right to choose whom they would have.

When William landed near Hastings, on the south coast, in the bright September weather, Harold was at York. He marched his army down south by the great Roman road to London in nine days, and very quick that was, when so many had to go on foot. But his men were not as fresh as they should have been for the fight.

The battle that followed at Hastings is one of the great battles of history. The Normans were led out by a singer on a fine prancing horse, and the whole army caught up his song about the great hero of France and how he fought and won. The English did their best, but the Normans were too strong for them. Harold was killed, and the bravest and best men of England fell fighting around him. This was on Saturday, October 15, 1066.

THE LONELY CROWNING OF WILLIAM THE CONQUEROR

By December William had forced the people of the south to own him as king, and he was crowned in Westminster Abbey on Christmas Day. No shouts of welcome, no bright faces, and when the question was asked, "Do you take William of Normandy to be your king?" there was but a sullen mutter; they

had to say yes. William was almost alone on that great day.

Freedom for England was gone. The knights were killed, the poor were in utter misery. William gave much land and goods to his Norman followers, and, instead of paying rent in money, they had to promise to supply him with fighting men when he went to war. They made the men to whom they let land promise to do the same.

This feudal system, as it was called, lasted for many years in England. So that there should be no doubt how much land everyone had, and how many soldiers it was worth, William had a great book prepared, Domesday Book, in which is a description of all the great houses and estates in the kingdom. That book is still of great use when ancient land titles are searched.

THE WORK THAT THE CONQUEROR DID FOR ENGLAND

Another work of William's which lasts to this day was the making of the New Forest, in Hampshire. William made it to hunt in, and sorely distressed the poor folk who were turned out of their homes for his pleasure.

Some of the great castles William built to keep the English in order are still standing. Chief among them is the old part of the Tower of London, in which is a most perfect Norman chapel. It is said that from the gallery of this chapel William the Conqueror and his family looked down on the service going on below.

William spent a good deal of his time in Normandy, and at last died there. His sons behaved very badly to him, and he was alone in his death as he was at his coronation, when all but a few priests rushed out to join in the tumult going on outside the Abbey.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 1565.



William the Conqueror and his men led by Taillefer the Minstrel.

SWIFT-RUNNING CHILDREN OF THE WILDS



The White Oryx.



The Chital Deer.



A Sambar and its baby.



The Yellow-backed Duiker.



The Kudu.



The Giraffe—tallest of mammals.



The little Musk Deer.

The photographs in these pages are, by Messrs. W. S. Berridge, Gambier Bolton, F. Bond, H. Irving, J. Newman, and others.



Moose in the snow of North America.

THE SWIFT RUNNERS

THE Old Testament men lived near to nature and were alert observers.

From what they saw they exalted the lion as the symbol of power, and the hart as the living expression of speed.

"The young lions roar after their prey, and seek their meat from God," sang Israel's poet-king; and, rejoicing in his own strength and fleetness, he cried, "He maketh my feet like hinds' feet." Isaiah employed the same image of speech in foretelling a time of happiness in which the lame man shall "leap as an hart."

What did these men mean when they spoke of the hart? It was one of the antelope or deer tribe, and possibly both may have seemed the same to them. Yet we now know that these animals differ from each other, on the one hand, and from their allies, the goats and cattle, on the other.

Cattle, sheep, goats, antelopes and deer all have hoofs, and may be horned. They all have the fourfold stomach of the ruminant. They swallow their food in haste. It is first received into the huge paunch, then is returned to the mouth, a little at a time, is chewed methodically, and transferred to the stomach for leisurely digestion in the other sections of that organ.

CONTINUED FROM 1378



In that all the cud-chewers agree. Now for differences.

The cattle have horns whose cores are composed of bone. The antelopes have horns whose cores are rather more solid bone. The deer have antlers of true bone, and shed them every year as a tree sheds its leaves, a detail in which they are unique.

Our present group is closely related to the group to which the more modern cattle and goats belong. Also, from them the great cats, the lion, tiger, leopard and other animals derive their food.

The carnivores have grown to might and frightfulness nourished by the flesh of these beautiful creatures. The battle is not always to the strong, else there would not be a deer or antelope alive. These animals have specialized in speed to avoid the carnivores, and are unmatched for pace and endurance. But the race is not always to the swift, or the flesh-eaters would long ago have been starved to death.

In this living larder of the lion we witness a marvelous natural balancing of forces. The great cats appear in the world three, four or five at a birth; the hoofed animals generally one at a time, though some have two or even



The Caribou of the North.



The Nilgai of India.



The Eland of Africa.

three young at a birth. Yet the peaceful herb-eaters outnumber their enemies by about a thousand to one.

The giant cats have prevented over-multiplication by the deer and antelopes, which might otherwise have overspread the earth and brought a general famine. There is no animal enemy powerful enough to thin out the number of lions, tigers and leopards, so nature herself interposes and decrees that, though so many are born as to threaten all other animal life, only the few, a sort of standardized number, shall live. Death is thus life's guardian.

To avoid animals as terrible to themselves as lions are to giraffes, many lesser creatures have taken to hiding in the earth, in the water and in the trees. The antelopes and deer have faced life in the open—in the deserts, in the hills, in the forests and in the marshes.

They have become excellent examples of what we may call protective resemblance. They have grown to match the color of sands and rocks, of trees and light-splashed reeds. The hoofs of some are perfect for hill-climbing. Those of others are ideal for speed over sands; and others, again, are astonishingly lengthened or modified to tread the boggy ways of marshes, of floating masses of vegetation, and of treacherous snow and ice.

From birth to death they live hunted lives. To us such an existence seems appalling. It does not seem to be so to them. Agitation and terror are fatal to animal fortunes, but here we have an assembly which has thriven in number of species, in the number of individuals of such species, and also in size, strength and beauty.

No; the lives of the hunted do not seem to be terrible to these splendid creatures. From birth they have the danger sense highly developed. Though they know that lions are all about them, they have consciousness of protection in the form of sight, scent, hearing and speed.

Use and instinct are everything. Perhaps a snail knows that unless he hurries he may find himself converted into a thrush's breakfast; a rabbit has unchanging views about the sinfulness of a mink; a monkey's nightmare is probably a vision of designing serpents. Yet the world goes well with snails and rabbits and monkeys.

A savage is happy over a lunch of

lizard, though surrounding tribes may covet his hut and his head. Civilized men find joy in life in which shop signs and branches fall, lightning plays and motor accidents happen. There is no existence without risk, and a leopard is really no worse to a gazelle than a mole to a worm, a toad to a beetle, or a spider to a fly.

The reindeer may meet the wolf-pack; the gnu may find a lion on its back. Both may never see such a foe. If the meeting does occur and is fatal, then the end is swift and merciful; for nature demands that if a flesh-eater is to succeed it shall be able to kill or destroy sense and feeling with one paralyzing bite. All is strife and battle in the wilds, but the blow is instant and vital with no lingering agony. The antelopes and deer die at once when attacked, or they escape and celebrate their fortune with good appetite whetted by their exercise.

Speed carries even the lordly eland to safety. King of the antelopes, his height at the shoulders makes a policeman look short; for his withers tower six and a half feet above the ground, and a fine bull weighs about eighteen hundred pounds.

Sight, hearing, speed, horns for defense kept the noble eland safe in Africa until something worse than a lion appeared—a two-handed creature with a gun enabling him to kill at a distance. The very splendor of the animal as a hunter's trophy makes us tremble for its existence. Only rigid laws or its domestication can save the eland. The fact that it thrives in some game preserves is hopeful, but only for the preservation of a few.

The bongo, a forest-keeping antelope, horned in both sexes, is the nearest relative of the eland, and the kudu must once have been a close cousin—a graceful antelope which makes up for deficiency of pace by cunningly plunging into high, rough ground when pursued. There it can pick its way with a dexterity impossible to any mounted man.

The peculiar white harness-like markings of their coats give the name of harnessed antelopes to the nyala, the situtunga and the bushbuck. Though their title does not suggest it, they love marshy situations, and the situtunga sinks like a submarine in the water, leaving only its muzzle, like a periscope, in the air.

To find a harnessed antelope outside Africa we have to cross to India, where



The Red Deer of England.



The Wapiti, or Elk, of the West.



The White-tailed Gnu.

the renowned nilgai, prince of all the antelopes on that side of the ocean, is the prize of visiting hunters, but fortunately so tamable as often to find its place among Anglo-Indian pets. In the same favored land is a rarity, the chousingha, or four-horned antelope, sufficiently described by its title.

The addax calls us to the African deserts, and there we find an amazing array of life. Except in rocky, sterile ways the desert has its season of vast gardens, which a later sun burns down like the grass of an August tennis lawn in a drought. There are springs in the desert; there are fluid-bearing melons and bulbs, and with these as a reserve when summer suns are fierce the Oryx group, comprising the gemsbok, the beisa, the Arabian and white oryx, get a living.

THE GRACEFUL CREATURE THAT WILL FACE A CHARGING LION

Bold horns surmount these fine heads, and not for ornament. A challenged oryx sinks upon his knees, swings his weapons like twin halberds, and it is death if they strike home.

Here is a grim tableau of desert life upon which a hunter once stumbled. An oryx and a lion lay fast-locked upon the ground. The lion had sprung; the oryx had received him full on its horns. The king of beasts died impaled upon that terrific defense; the oryx died immovably yoked to his bloodthirsty victim, food for vultures both.

The fine sable and roan antelopes, prominent in the pages of every game-hunter, must be noted as we pass on to those graceful little desert antelopes, the gazelles. Unlike the generality of antelopes, in which horns are mainly confined to the males, most gazelles of both sexes are horned.

THE LIVING SEA THAT SWEPT THROUGH THE PLAINS OF AFRICA

Numbering over a score of species, the gazelles furnished in the springbucks a genus which can hardly have been exceeded in number by any hoofed animal. Before South Africa became so thickly populated these animals gathered together for their annual migrations in such hosts as to beggar imagination. They moved like a living sea through the plains; through the openings in the hills they poured as torrents; in the valleys they were likened to swarms of locusts which darkened the sun. Nothing could stand

in the line of their march. A flock of sheep, a charging lion, a man, were swept away and trodden down by mere numbers. Beasts and birds of prey hovered on their flanks; many were killed; many sank from exhaustion in the centre of the throngs and were trodden into the earth. It was like a lemming migration—but the springbucks turned with the coming of rain, scattered, and lived.

Names known in the records of travel are borne by some of the gazelles, as, for example, Cuvier's, Kennion's, Loder's, Speke's, Grant's, Thompson's, commemorating the discovery by each of these men of a species not previously described. They are all slight, exquisite creatures, the greyhounds of the tribe, and a tribute to desert fare and conditions.

Returning to the larger animals by way of the handsome Indian blackbuck, famed for its speed, we note the saiga, with its clumsy build and curious swollen nose and extraordinary nostrils. The waterbuck seems to skim up and down the hills, yet is really a creature of the reedy marshes and papyrus clumps. Among African crags the klipspringer and rhebok occupy the place of the chamois in Europe. Then we have pigmy antelopes only a foot high; fantastic little dik-diks, with muzzles suggesting the tapir; and a species so noted for its art of hurried hiding in the reeds that the Dutch called it the duikerbok, which means "diving buck."

THE QUAIN ANTICS OF THE GNU IN THE PRESENCE OF THE HUNTER

The gnus follow. They are the most singular of antelopes, with horns like the buffalo, tail and mane suggesting the horse, and the legs of an antelope. Their habits are as strange as their appearance. In the presence of a hunter the bulls leap, caper, butt each other over, dash at the foe and away, perhaps charge home, or fly as if wasps were at their tails.

They have immense speed, power and endurance, and when all these qualities are concentrated in captivity, they are voted the most dangerous beasts in our zoos. There are two species of gnus, the white-tailed and the brindled, and closely allied are the similarly fashioned hartebeests, seven species or more, long-headed, melancholy-looking beasts, but in reality less sad than savage.

What is called the American antelope is known to science as the prongbuck, a

handsome mystery. The horns are differently shaped from those of other antelopes, and the sheaths are shed yearly, which is an un-antelope-like feature. But the bony cores are not shed, and that is un-deer-like. Thus they seem to possess characteristics of both groups and to belong to neither. America has no true antelopes.

Until recent years the position of the giraffes was as isolated as the prong-buck's. They stood by themselves, with

stretched up to feed in this way, till he has grown to what we see.

Deprive him of his lofty acacia trees and he would find difficulty. To drink or eat from the ground he has to stretch his front legs far apart to bring his head low.

But the life suits the giraffe. He has developed a tongue of tremendous length, and so fine that its tip can enter the hole in a latchkey. His upper lip is as nimble a picker of leaves as a spider monkey's



The Okapi.



Sable Antelope.



The Prongbuck.



Cuvier's Gazelle.



A herd of Fallow Deer in an English park.



The Harressed Antelope.



The Bush Antelope.



The Rhebok.



The Klipspringer.

no near links to connect them with any other existing species. But then the okapi was discovered. The giraffe is an example of giantism. Probably no living type of elephants has ever produced an animal exceeding twelve feet. But the male giraffe may be eighteen feet high at the crown of his head! Yet he has exactly the same number of bones in his neck as a pigmy shrew, the tiniest of mammals—seven, but such a seven!

All the Antelope group always fed on grass and low-growing herbage; the giraffe took to feeding from trees. For thousands and thousands of years he has

tail. He has magnificent sight in the watch-tower head; he can gallop, though ungracefully, at more than a horse's pace; he can kick with greater force than any other animal, knock a horse over with a side-swing of his horned head; and can live for months at a time in the desert without water.

The true relationship of the giraffe to the rest of the living animals was revealed early in the present century by the revelation to civilization of the okapi. Fossil remains of some such animal had been obtained in Africa and India, but never a living okapi had been seen. Pigmies of

east central Africa spoke of them; and a piece of skin used by a native as a bandolier was found.

A Dutchman had heard of it and called it a unicorn-like animal. Stanley had heard of it, and when Sir Harry Johnston was going out to Africa, said to him: "If you get a chance, dip into that wonderful Ituri forest, for you may find there the donkey which the pigmies told me they caught in pitfalls."

How the beast was eventually tracked down and skins sent to England, to prove that it was a primitive member of the Giraffe Family, is too long to be told here, though it is a splendid story. The okapi is five feet in height, shaped like a giraffe, though shorter in neck and legs, and the male has short horn-like processes on the forehead. As the voiceless giraffe keeps to the sunny open, its loud-voiced cousin keeps to the deepest, darkest forest, and feeds on leaves of banana-like plants.

THE BIG CREATURE THAT CAME TO LIGHT AFTER THOUSANDS OF YEARS

We never expected to see one alive in Europe, but Antwerp has, or had, one. A baby okapi was brought up by hand in the forest by Madame Landaghem, wife of an officer of the Belgian Congo Medical Service. She kept it for three years, and made it as tame as a pet deer, then sent it in 1919 to her native land. And so, after thousands of years, a hidden animal came from the gloom into the light of day. Truly there is ever something new from Africa.

Now we must glance briefly at the deer, pausing for a moment to emphasize again the unparalleled story of their antlers. These are borne, except in the case of the reindeer, only by the males. As we have seen, these antlers are yearly growths.

Two bony bosses, or pedicles, appear on the stag's forehead, above and behind the eyes. These are a permanent part of the skull. From these there grows up a mass of bone. It is covered with skin and hair, like the ordinary hide, and is richly fed by blood-vessels. From the coursing blood, bone is deposited, just as it is in the human jaw after a large tooth has been extracted.

The antlers grow, according to the pattern of the species, in a few months. Then a heavy ridge of bone forms round the union between the pedicles and the antlers, shutting off the blood supply. The skin of the antlers, called velvet, dies

and peels off in shreds, and at last the antlers, rough, rugged and formidable, appear in naked beauty.

But by this time the antlers themselves are dead bone. The stag carries them through the winter for his battles for mates, then the mighty defenses fall off like decayed branches from a tree.

HOW THE STAG'S MIGHTY ANTLERS ARE RENEWED EVERY YEAR

Almost at once new antlers begin to grow, and the entire process is repeated. Every year this happens. At first the young males have small simple antlers; with each increasing year the growth becomes bigger and more branched, until in his prime the fine creature has a spreading frontlet seventy pounds and more in weight.

We may see the wonder every year in the deer, which we see in the great zoological parks, or in the game preserves which either the government or wealthy men have established. It is a superb breed of animals roaming throughout Europe, northern Asia, northern Africa, and North America, though broken up into varying local races.

The red deer is the more common European deer and is the one chiefly hunted. They have their seasons of ferocity, though generally they are wary and in-offensive. Unless wind brings scent to them, they may be approached openly to within a few score yards without their taking to flight.

Larger antlers than those of the red deer are carried by the wapiti, a noble North American creature which has cousins in central and northeastern Asia. With the larger armament comes larger will and force to use them, so that an angry wapiti is described by hunters as a fiend on four feet. It is often called the American elk and is becoming scarce.

HOW SOME DEER USE THEIR TEETH AGAINST THEIR ENEMIES

Smaller, but extremely handsome, is the fallow deer, of which Great Britain possesses two species, the spotted and the brown. Deer of this kind were among the food-providers of the old cave-men, but it is thought that the modern ones were brought in long after the native stock had been exterminated. Still smaller is the roe deer.

What red and fallow deer are to Europe the chital and sambar deer are to India and southeastern Asia. They are the

typical woodland and jungle deer. They puzzle us, however, for some of the chitals do not shed their antlers, and sambar stags are known at times to carry one pair for seasons, which deer should not do.

Hoofs and antlers serve to defend these animals, but in the hog deer, the muntjac and the musk deer, we find sharp, pig-like canine teeth used to gash and lacerate an enemy. But these teeth serve also to grab up roots and bulbs for food.

THE DIFFERENT DEER OF NORTH AMERICA

The common American deer is called the Virginia deer, though it is found all

tailed deer. Some students count at least eight species.

This is the deer which the early settlers of North America found in such great numbers. It furnished food and clothing, and its sinews were used for thread. In spite of all its enemies many thousands are still living in the forests of Canada and the United States. Where they are protected by law they increase rapidly even in the neighborhood of towns.

Across the Mississippi we find the mule deer, so called because of its enormous ears. It is also sometimes called the



By permission of the New York Zoological Society.

THE VIRGINIA DEER

over eastern North America and closely related species are found across the Mississippi. Some scientists, in fact, think that all are simply variations of one stock, but others think there are several different species. All are graceful, timid creatures, swift and good jumpers.

The color is chestnut above, in summer, with white under-parts, though some are paler than others. In winter the upper parts change to yellowish gray. The different varieties or species vary somewhat in color and size. The Northern deer of Canada, New England and New York is larger and grayer than the typical Virginia deer, while the Florida deer is smaller and almost black. The species found in the Pacific is called the white-

black-tailed deer. Though only a little taller than the Virginia deer, it is considerably heavier, and its antlers are different. Another species, the Columbian black-tail, is somewhat smaller and darker. It gets its name from the Columbia River, and is plentiful in British Columbia, Oregon and Washington. Cousins are found in California and Alaska.

THE TREMENDOUS VALUE OF THE REINDEER TO THE LAPLANDER

From the tiny musk deer we advance to that fine upstanding animal, the reindeer. The wild caribou quite evidently belongs to this group. Widely distributed throughout the northern regions of the Old World and the New, reindeer are

an indispensable aid to human life in Siberia, Lapland, Norway and Russia. A few years ago the government brought some true reindeer to Alaska. They have greatly multiplied, and have made living much easier for the residents of the territory. They furnish food and clothing, and sometimes sledges drawn by reindeer carry the mail to remote settlements.

Free, the reindeer feeds in summer in valleys which have no ice; in autumn they go to the coast to eat seaweed; in winter they find rich food in lichen on the hills. Their mastery of their wintry surroundings is due to the beautiful adaptation of their hoofs. Each foot comprises a pair of hoofs in front and a second pair at the sides and rear; and between the two pairs is a dense patch of coarse hair. The hoofs spread out on the snow like a camel's hoof on the sand; the hair prevents all slipping on ice.

We all know the immense value of the reindeer in domestication, as a beast of burden, charger, draft animal, and as provider of milk and meat and clothes. No animal means quite so much to us as the reindeer to the Laplander. The migrations of the wild species, the caribou, in Siberia and America have often been described.

THE WILD CARIBOU FROM WHICH THE REINDEER COME

The caribou fall into two great groups, the woodland caribou and the barren-ground caribou. There are several species or subspecies of each. As might be expected, the barren-ground caribou which live in the dreary wastes of the north are smaller and paler in color than the caribou of the forests. One, the Peary caribou, is almost white. In its range the winter night lasts from three to five months, but it thrives, nevertheless.

These caribou of the barren grounds, like camels, store up fat for the winter. During the summer when food is plentiful a layer of pure tallow several inches thick forms under the skin of the back. This is entirely absorbed before spring. In the early winter the Eskimo and Indian hunters strip it off whole and prize it as an article of food.

The northward migration of the Alaskan caribou in October of 1922 made Dawson, the gold-mining city, the centre of a herd which spread in all directions over an area of fifty square miles.

THE QUEER-LOOKING ANIMAL WITH ANTLERS SEVEN FEET LONG

We began with the eland at the head of the Antelopes; we have in the elk the colossal monarch of the Deer. Here is an animal measuring up to seven feet in height at the withers and with titanic antlers seven feet in span.

But beauty and dignity do not always accompany bulk. The elk, or moose, as it is incorrectly called in America, carries his long neck in a horizontal position, with the head lower than the withers, and the fantastic head and the huge donkey-like ears—perfect for hearing but ruinous to good looks—make this magnificent animal a little grotesque.

He is well fitted to his life in the northern forests. His long legs carry him through deep snow and over fallen trees at a stride; they carry him across flooded rivers, and bear him ahead of the wolf pack. He looks like one of the nightmare creatures long ago extinct, and when bull moose fights bull moose, we get an idea of what life must have been thousands of years ago. The Alaskan variety is the largest of the deer. It is sometimes eight feet tall. The moose are creatures of the wilderness. While many yet remain, their future existence depends upon the protection of the law.

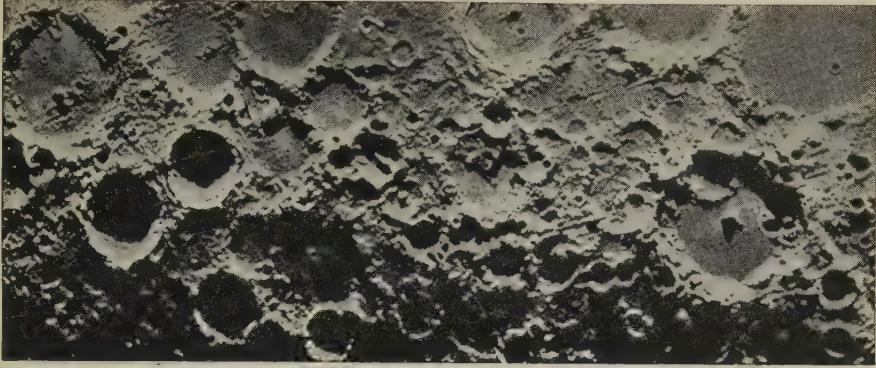
THE TINY ANCESTORS OF ALL THE DEER

Many more species of deer reward the study of the seeker. There are Chinese water deer, which keep to river courses and lack antlers; and American deer called brockets because their tiny antlers recall those of young red stags, which are termed brockets when sporting their earliest horns.

Finally there are the chevrotains, or mouse deer, little creatures of Asia and Africa, hiding in tall grass or among rocks by day and coming timidly out to feed by night. Measuring only from ten to fifteen inches high, they stand alone, living relics of a very ancient past. They are not deer, they are not antelopes. Their history is to be read in extinct forms.

Enough has already been said to indicate representative characteristics and species of this great family of swift runners. They have grown to grace and unsurpassed powers among multitudes of ravaging enemies, and have prospered as they deserved.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 1595.



The immense craters that stretch across the face of the moon.

IS THERE A MAN IN THE MOON?

IF the moon is inhabited at all, it must necessarily be by a race of beings utterly different from anything we know on earth, for every living thing on earth is the creature of our local conditions.

We breathe air, we are dependent on climate, and we are what we are in height and power solely by reason of the density of the atmosphere. If the density of the air increased, we should become a squat people, unable to walk upright, unable to lift a small weight; if the density of the air lightened, we could leap over hills and toss heavy weights above us.

Now, there is no atmosphere enveloping the moon, and so the race of possible beings inhabiting that lovely sphere must, to begin with, differ from us in breathing. They would be without noses and without lungs. And think of their cities. A temple or a villa on the moon would last forever. Air would not corrupt it, rain would not tarnish it, lightning would not rend it. Glass windows would not exist there, for without rain and wind who would think of glass windows? Such a thing as a kitchen, or even an ordinary fireplace, would not be found among them, for, as there is no air, no fire can be lighted, no match can be struck.

And the people walking through the streets of this eternal city would be a

CONTINUED FROM 1356



dumb race. They would never speak, because speech does not exist without air; they would make no noise with their feet, for sound does not exist without air.

The moon might be filled with lovely flowers, but they would give off no odor. Birds might sing from every branch, but no note would be heard. Men might cry to the heavens, but not a whisper would escape their lips.

A soundless, airless, waterless city would a city be on the moon, eternal and incorruptible.

If we look at the moon through a telescope, we do not see what is often called a "face" at all. It merely happens that the marks sometimes look very much like a face to the naked eye.

The marks consist of mountains, craters and the sunken beds of what were once probably seas and oceans. The most prominent of these markings, and those that help most to give the appearance of a face, are made by volcano craters, and these are vastly different from any we know on earth because they are enormously larger. Probably all the volcanoes on the earth could easily be put together into the crater of one of the moon's volcanoes. One of these craters is many, many miles across.

The general name for a moon is a satellite, or attendant. The earth it-

self has one satellite, which we call the moon; Saturn has ten; Jupiter has nine; and so on.

A satellite is a body which revolves round some other heavenly body, which is usually called the satellite's *primary*. Our earth, then, and all the other planets, are satellites to the sun, and thus play the part of moons to the sun. But the sun is the only world to which the earth is a moon, for it is the only world round which the earth revolves. It may be that the sun revolves round some other great star, and so is a sort of moon to that star, in which case the whole of the sun's family would be moons to that star; but our leading astronomers now think that this is not so.

WHAT ARE THE SPOTS WHICH WE CALL FRECKLES?

What we usually speak of as freckles are spots of a yellowish brown color which are seen on the skin of some people, especially after they have been exposed to strong sunshine for some time. They occur chiefly on the face, on the neck and on the hands, because those are the parts of the skin unprotected by clothes. Some people are much more likely than others to have this coloring produced, and in some it disappears quite quickly, while in others it lasts a long time.

In all these cases the freckles are the result of the action of the sun on certain cells of the skin, which causes these cells to produce coloring matter or pigment, which remains there for a certain time. There are cases, however, in which freckles do not appear to be caused by very hot sunshine or exposure, but come naturally, just as the color of the skin itself is either fair or dark, according to the tendency inherited by the individual.

WHY CAN WE HEAR A WHISPER ACROSS THE DOME OF ST. PAUL'S?

Perhaps we have often noticed that it is sometimes much easier to hear a speaker than at other times, and that this does not seem to depend upon the size of the building. In some large buildings it is very easy to hear perfectly, and in some small buildings it is difficult. It all depends on the shape and arrangement of the walls in relation to the sound-waves which have to come to our ears before we can hear anything.

Now, in the dome of St. Paul's it happens that the construction and arrangement of it is such that the sound-waves

set up even by a whisper are so controlled that a person standing at a distance can hear them distinctly. It is a mere matter of directing and controlling waves of sound so that they are not dispersed, and that is why we hear them.

WHY DOES THE THAW BURST THE WATER-PIPES?

It does not do so. The supposed bursting of water-pipes by the thaw is a pure illusion. It is a telling example of the folly of taking for granted that if event B follows upon event A, B is caused by A—a folly which leads to all sorts of unfortunate consequences in human affairs.

What really happens to the water-pipes is this: When water freezes, it increases its bulk. Therefore, when the water in the water-pipe freezes, and the water inside it turns to ice, the ice is greater in volume than the water out of which it was formed. It presses so irresistibly upon the pipe that it bursts it open to make room for itself. So the water-pipe is rent asunder. We do not know it, however, because there is nothing to reveal the fact. As soon as the thaw comes, the damage shows itself in a most unpleasant leak. As this happens with the thaw, many people jump to the conclusion that the thaw did the mischief, but the moral, of course, is that we must not believe everything we see, and that inquiry into very common things often reveals curious and unexpected truths.

WHY DO WE COOK THE FOOD WE EAT?

We cook our food chiefly for three reasons: to make some foods look more appetizing, to soften hard and tough foods, and to kill any microbes that may happen to be in the food.

The first reason is not a particularly good one, for meat that is raw or half raw is sometimes more digestible than meat that is cooked. But the other two reasons are quite sound. Many vegetables, such as potatoes, are almost indigestible till cooked, and there would certainly be many more cases of food-poisoning if food were not cooked. Strangely enough, however, one of the foods most apt to be contaminated with microbes is rarely cooked at all; we mean milk. Many microbic diseases, such as typhoid and diphtheria, are spread by milk, for this reason. Some foods, however, are said to be more digestible when eaten raw than when cooked. Cabbage is one of these.

WHY DOES IRON FEEL COLDER THAN WOOD?

Our feeling whether anything is hot or cold does not depend wholly upon how hot or cold the thing really is. The marble on the washstand and the towel beside it are both of the same temperature, but the marble feels much colder than the towel. All the parts of a hammer are of the same temperature, yet the iron head feels much colder than the wooden handle. In all these cases the thing we feel is colder than our skin, as a rule, and so heat will flow from our skin into the thing. Our feeling depends on the rate at which the thing takes heat from our fingers. Marble and iron take heat quickly from our fingers; they make our fingers cold, and so we say they are cold, meaning really that they make us cold. But wood and cotton do not take heat away nearly so quickly from anything warmer than themselves, and so we say they are not so cold. We ought to say that marble and iron are good conductors of heat, and wood and cotton bad conductors.

HOW MUCH STUFF WAS DUG OUT TO MAKE THE PANAMA CANAL?

From the time the United States began work in Panama to the formal opening of the canal by President Wilson in July, 1920, about 240 million cubic yards of material had been removed by digging, dredging and blasting. Probably half the material removed was limestone, which weighs more than two tons a cubic yard, and if we average the earth taken out at a ton a yard, the total weight removed would be about 360 million tons.

To move this vast amount of rock and earth the most extensive and elaborate equipment ever collected for one purpose was brought together. There were 101 steam shovels, 307 locomotives, 4,572 cars and trucks, 553 mechanical drills, 20 dredgers, 47 cranes, 72 barges and lighters and over a hundred other appliances, some of them of amazing ingenuity.

The steam shovels were able to remove as much as 8,000 tons of rock and earth in an eight-hour day, and at one time 43 were cutting through the Culebra mountain.

The quantity of explosives used in blasting was 77 million pounds, and in the Culebra cut alone 2,500 tons were used in a year. The biggest single explosion was one in which 26 tons of dynamite and blasting powder were used. In

the Culebra cut 377 drills were used, and the holes drilled to receive the explosives for blasting, if put end to end, would reach ninety miles.

One apparatus was called a spreader, because it spread out the material unloaded from wagons, and did the work of nearly 6,000 men working by hand. At the Culebra cut nearly 2,300,000 tons of material were removed in one month.

WHY DOES A FOG DEADEN SOUNDS ON THE SEA?

The intensity of sound varies according to the law of physics, which is equally true for light, for heat and for gravitation, as well as sound. This law states that the intensity varies *inversely* according to the distance; that is to say, the farther off the sound is the less audible is it; but that is not the only thing that causes the intensity of a sound to vary.

The second condition is the density of the medium through which the sound is transmitted. For instance, no doubt we have noticed how clearly we can hear sounds on a frosty night, and the reason is that the air is more dense.

On the other hand, if a gun is fired on a high mountain, where the air is extremely rarefied, the sound is no greater than that of a pistol under ordinary circumstances. In the case of a fog, the solid particles in the air may affect the transmission of the waves of sound, but the main thing which influences the intensity of any sound is the density of the atmosphere.

WHY DO TEA AND COFFEE KEEP US AWAKE?

Both tea and coffee contain a stimulating substance. In tea the substance is called *theine*, and in coffee *caffeine*, but theine and caffeine are chemically almost the same, and their effects are practically the same.

These substances appear in some mysterious way to stimulate the brain and prevent it from becoming drowsy. Their effect in this way varies in individuals; but probably in most cases strong tea or coffee tends to hinder sleep. In themselves they are not harmful in moderation; but if they prevent sleep, then, of course, they do harm indirectly. Moreover, if taken for the purpose of banishing sleep, the result is that a condition of chronic sleeplessness is produced. Children do not require to be stimulated, and are better without tea or coffee.

HOW DOES A COW MAKE ITS SUPPLY OF MILK?

There are certain parts of the body which exist to produce things the body needs. These are called glands, and they are the chemists of the body. Some glands exist in order to filter out from the blood things which it does not want. Many glands in the skin do this. Other glands—like one just below and in front of the ear, which gets swollen in case of mumps—make the saliva that pours into our mouths when we eat, and helps us to soften and digest our food.

But there are certain glands which are a thousand times more beautiful and wonderful than any other, because they do not exist to serve the body to which they belong, but for the sake of others. They show that Mother Nature is on the side of love.

When the cow has a calf, the gland called the udder, which makes milk, becomes active, and has the wonderful power of transforming the blood that passes through it into milk for the young calf. The calf's mother eats grass and turns it into blood. Then the udder turns the blood into milk, which is the best food for calves, as it is also the best food for us. If we could see the udder under the microscope we should see the cells near the bloodstream taking out of the blood everything they need in order to make milk, which passes directly into the calf's stomach—pure, warm, and containing everything the calf needs for its growth.

WOULD THE EARTH SEEM TO BE UP IN THE SKY IF WE WERE ON THE MOON?

Yes. The earth is a ball, and anyone looking out from the surface of that ball gets the notion, of course, that he is in the centre of all things hung in the sky on all sides of him. We see things *up* in the sky and not *down* in the sky because the earth interferes with our view. If the earth were transparent, we should see the sun and moon when they are *down* in the sky, underneath our feet, just as now we see them *up* in the sky.

This must be true not only of the earth but of any other heavenly body. Up and down have no real meaning in themselves, but merely refer to our point of view. The earth, seen from the moon, would appear far larger than the moon does to us, and correspondingly bright. There would be no mistaking the differ-

ence between land and ocean. Through telescopes the largest buildings of a city could be made out. The greatest difference would be, perhaps, that an observer on the moon would so often find the details of the earth hidden by clouds. As the moon has practically no atmosphere, her face is never clouded to our view; not even to the very slight extent that Mars sometimes is. But anyone on Mars or the moon would wonder what it was like to live on a world so often covered with thick clouds as ours is.

WHY CANNOT HUMAN BEINGS GROW A THIRD TOOTH?

When we are born we have, hidden in our gums, all our first teeth. These twenty teeth are already completely formed in all their parts at birth, and have only to get through the gums in order to be seen. A baby gets its food by sucking, not by biting, and so it is really better that its teeth should be out of the way at first, below the gums. Still deeper in the gums, below the first teeth and farther back in the jaw than the primary teeth extend, are little groups of cells called tooth-germs which will some day make the second set of teeth. There are thirty-two sets of these cells; and though none of them are teeth, they have in them the power of making teeth.

We should take great care of the first teeth, brushing them and having them filled if they decay, even though we know that they will fall out soon. If they are neglected, the tooth-germs underneath them are apt to be injured, and when the new teeth come, they will be irregular or have thin, soft, crumbly outsides, which easily break away or decay. We see why a second tooth grows when the first falls out or is pulled out or is knocked out. But no third tooth will grow when a second tooth has been lost, because there is no other tooth-germ for it to grow from.

WHY IS A FIRE PAIL FILLED WITH SAND?

In offices and large buildings where electricity is used there is always a danger of fire through what is known as a "short circuit." Water is a conductor of electricity, and its use in this kind of fire might only serve to spread the electric current, and so increase the danger. Sand, on the other hand, if applied at once, would soon smother and extinguish the flames without serious damage.

HOW DO CLOUDS STOP SUNLIGHT IF THEY ARE PURE WATER?

In all its forms water stops and takes into itself a certain amount of the light of the sun. We know that liquid water does this, for it very soon becomes darker as we go down through it. Ice does so, too. Gaseous water does so least, and the gaseous water which is always present as part of the air does not stop enough of the sun's light for us to notice. But water in the form of round drops suspended in the air, which is what clouds are really made of, can stop a great deal of sunlight.

We can understand this at once if we remember what a soap-bubble looks like. Here is a bubble made mostly of water; it has a beautifully bright and glittering surface. That means that the light falling upon it is largely thrown back from its surface. So if there is a cloud made of millions of tiny bubbles or drops—which are also glittering things—it will throw back a great deal of the light that falls upon it. We can understand this when we see the lighted side of a cloud. Nothing could be more brilliantly white than the clouds like snowy mountains which we often see. They are white and bright just because they do not allow the sunlight to pass through them, but reflect it, or throw it back, from themselves.

WHERE DOES ALL THE BAD AIR IN THE WORLD GO?

The answer to this question can teach us a great lesson about the meaning of words such as "good" and "bad." It is probably wisest and most reverent for us to believe that, in the long run and in their right places, all things are good. That, at any rate, is certainly very true of what we call bad air. By bad air we usually mean carbon dioxid which has come from our lungs or from a fire or a lamp, or from the breathing of animals.

We may rightly call such air bad in a sense, because it is bad for us; if there is too much of it in the air any animal is given to breathe, the animal will die. But this carbon dioxid is moved about, and so it gets distributed very evenly throughout the air. It is remarkable to find how similar and constant is the proportion of carbon dioxid in the air. This gas is of the utmost importance for our lives, even though we rightly call it bad when it is in the wrong place and in the wrong quantity. Without carbon dioxid all the green trees and plants would soon die of

starvation; then all the animals that live on plants would die; then all the animals that eat vegetarian animals would die; and, lastly, when everything else had died, we ourselves would die.

WHY DO FARMERS GROW CLOVER ONE YEAR AND WHEAT THE NEXT?

In early times it was discovered that if wheat were grown year after year on the same soil in the same field, the crop became poorer as time went on. The Romans knew this, and therefore they made a practice of leaving a field bare, or fallow, in some years, to give it time to recover. The Romans introduced the practice into Britain.

In the seventeenth century, however, it was discovered that it was unnecessary to leave a field fallow for a year, because a different crop could be cultivated which, instead of injuring the wheat crop of the following year, helped it. Among such crops the beautiful plant called clover holds a high place. Clover is a valuable food for animals, and has the quality of adding to the nitrogen in the soil which wheat requires.

Therefore, when clover is grown one year and wheat the next, we get two useful crops, the first of which helps the second. This method of alternate planting is called the "rotation of crops." One method is called the Norfolk rotation, and takes four years to run. The crops of the four successive years are in this order: turnips, barley, clover, wheat. If such a method is not adopted, and if it is desired to grow wheat in the same field every year, it becomes necessary to apply plenty of manure.

HOW DID THE WORDS "IN GOD WE TRUST" COME ON A COIN?

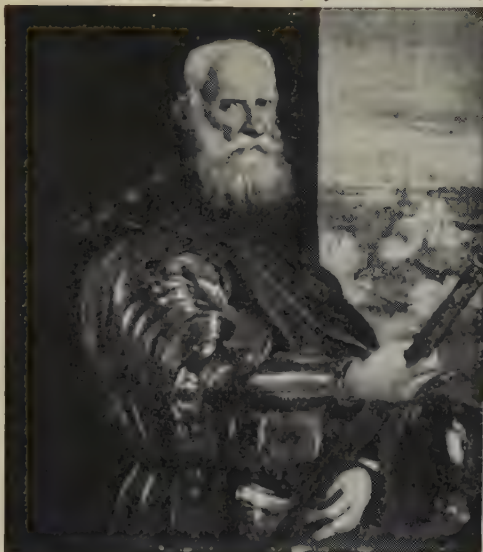
On all gold and silver coins of the United States large enough to hold the words is put the inscription: "In God We Trust." It is that the idea originated with James Pollock, who was governor of Pennsylvania from 1854 to 1857. During the Civil War, believing that the recognition of God on the national coinage was a national duty, he wrote to the Secretary of the Treasury and urged that this motto should be put on all the coins of the United States. The suggestion was approved by Congress, and a bill was passed unanimously by the Senate and the House of Representatives authorizing the motto. The motto was first used in 1866.

THE NEXT WONDER QUESTIONS ARE ON PAGE 1605.

PART OF THE FAME OF VENICE



The Marriage of Cana, by Paolo Veronese, painted for Venice but now in the Louvre.



Admiral Veniero, by Tintoretto.



Industry, by Paolo Veronese.

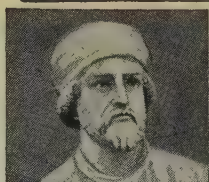


St. Stephen in Dispute with the Doctors, from a cycle of St. Stephen's life painted by Carpaccio.

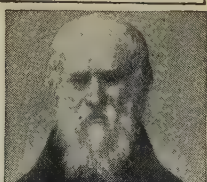
The Book of MEN AND WOMEN



Albrecht Dürer.



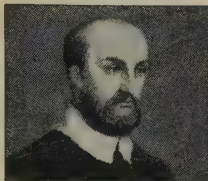
Donatello.



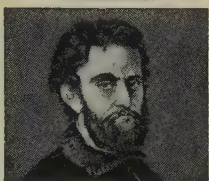
Tintoretto.



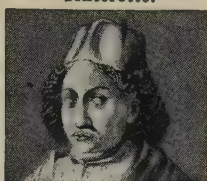
Giovanni Bellini.



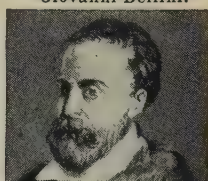
Andrea Palladio.



Giorgione.



Verrocchio.



Paul Veronese.

THE MAKERS OF VENICE

VENICE, the Queen of the Adriatic, is old, but age does not disfigure her. Our admiration and love for her increase as she grows older. She is very beautiful in her old age, and very pathetic. All her glories belong to the past. Venice is slowly decaying.

She stands like some beautiful vision upon the sands of the seashore, and men, as they see her image reflected in the gleaming waters of the lagoon, wonder if it be not some fairy fancy that they picture. Cities such as Venice seem to belong more to dreams and poetic visions than to this world of ours. Before asking who made Venice, we must for a moment recall the means by which this strange city came into existence.

Many hundreds of years ago, when barbarians overthrew the might of Rome, a few descendants of the Romans were driven before the conquering Goths and Lombards down to the coast of the Adriatic Sea. They hid in swamps and in the little islands formed near the coast. Many years passed, and the handful of people who had fled in terror from the Goths became noted as bold fishermen and sailors.

Each island was controlled by its own tribune, appointed by the people of the island, and each island was quite independent of the others. After

CONTINUED FROM 1368



Lion of St. Mark.

two centuries, however, the people appointed one man a duke, or doge, to rule over them all, and they became rich and powerful. No longer did they fear attack from the mainland. They constructed bridges to join the islands together, and canals were made along the channels where the water had previously flowed unchecked. They built a powerful fleet, and this fleet they sent, in 828, to Alexandria, where it is said to have recovered and carried back to Venice the body of St. Mark. In honor of this saint the Church of St. Mark was built.

Venice became a crowded, wealthy and important city. She sent out her soldiers and her ships with the Crusaders. She built up a great trade. She bought from the East and sold to the West. She bought from the West and sold to the East, and her own manufacturers became famous. She made conquests on the mainland, and she captured islands at sea.

Venice became one of the richest cities in the world. Her decline began when America was discovered, and when the new route to India was found, as we read on page 89. After varying fortunes in war she eventually lost her independence, and is now a part of the kingdom of Italy. While her citizens were so prosperous they had ample



CAESAR.



SPENCER.



MACDONALD.

means for making their city beautiful. Her richest residents could not build great military castles such as the barons of England and of Germany built. There would not have been room for them in Venice. So they built gorgeous palaces of marble. The Republic, as a body, could not build huge forts, for there was neither need for them nor space on which to erect them. So they devoted their money to erecting the most splendid halls, council chambers, palaces for their rulers, museums, libraries and churches.

VENICE, THE BEAUTIFUL CITY THAT RISES FROM THE SEA

They had very little space on which to build, for the city is made up of very many little islands, with the famous Grand Canal running like a capital S among them, and with over a hundred smaller canals, all bridged at frequent intervals. Therefore, as they could not have a city vast in size, they made one unequalled in beauty.

Her widespread trade brought her into relationship with all the civilized world, and she gleaned knowledge from them all. The fall of the Greek Empire sent the learned Greeks to Venice for refuge. They taught the Venetians all that they knew, gave them the treasures of the old writers, and so implanted a love of learning in them that it is to the Venetians we owe some of the finest things in our literature.

Great works which would have perished forever were translated by them, and preserved for all the world. The Arabs, who were then among the masters of learning in the world, taught the Venetians how to make gunpowder and how to make glass, and taught them also the first principles of decorative art.

East and west, wherever they went, the Venetians were always learning. In Persia they learned the art of weaving costly fabrics, and gained there a knowledge of architecture.

THE MARBLE BUILDINGS THAT ARE THE GLORY OF VENICE

Their early building combined many styles, which included the elaborate fancy of the East with the sterner simplicity of the northern countries of Europe. But all was so beautifully blended, producing a distinct Venetian style, that there was nothing to be found in the world quite like it. In their conquests they destroyed old buildings so that they might have the

marble for their own city. They built the inner walls of their palaces and public buildings with brick, but they covered these with slabs of marble. Their mortar was not suitable because it would not withstand the action of sea-water; and they needed marble, as well.

One of their victories opened the way to rich quarries of red marble near Verona, and with this they were delighted. At about the same time the victory in Padua gave them possession of a hard lime for making mortar that would defy the sea-water. These two examples show us how keenly alert they were to improve their beloved city.

The building of St. Mark's Church held the attention of doge after doge, as it went on through generation after generation, for hundreds of years. The square in which this rare building stands was formerly a field with a canal running through it, and two churches in turn had been built on the same site, to hold the relics of St. Mark, before San Marco as we know it now was begun.

ST. MARK'S, THE CHURCH WHICH GREW BEAUTIFUL THROUGH THE CENTURIES

Wherever success attended the armies of Venice, or wherever religious men could buy, other places of worship were deprived of their treasure to enrich the walls of the Church of St. Mark. A good example of this we find in the story of the four bronze horses above the main western doorway of San Marco, which is told under Architecture in Christian Times.

For century after century the church grew; its shape was altered, its treasures increased, until in the beginning of the nineteenth century the great Napoleon conquered Venice, and the usual course of the city's life was interrupted. This cathedral possesses one of the richest collections of church plate, and its retable, or altar-piece, called the Pala d'Oro—a marvelous piece of work in gold, jewels and enamels, which stands behind the altar—is without equal throughout the world. It is a picture of Christ, attended by archangels and angels and prophets; but the entire work is in precious metal or valuable jewels, and the most beautiful enamels, through which the rich gold setting shines. It was ordered made at Constantinople in the year 976.

The Doge's Palace is another of the wonders of the city, and is not the less wonderful when we remember that it takes

FRUITS OF A SHINING AGE



Virgin and Child, by Giovanni Bellini.



Portrait of a General, by Giorgione.



Portrait of a Woman, by Tintoretto.



Portrait of a Man, by Albrecht Dürer.

the place of older buildings which were pulled down piece by piece to make room for the new one as it rose. It was begun about 1300 by a great doge named Pietro Gradenigo, but before it was finished centuries had passed.

THE DUKE WHO PAID A FINE THAT HE MIGHT MAKE VENICE BEAUTIFUL

After nearly a century, when the new building had been well advanced, and part of the old palace was still standing, the Venetian Council decreed that things should remain as they were, and that any one daring to propose any more building on the new palace should be fined 1,000 gold ducats. In spite of this threat, Doge Tomaso Mocenigo dared to make the proposal. He paid his fine; the rest agreed, and they put the money into the building fund. The enlarging and beautifying of the palace began again in 1424, and did not stop until the work was finished, in the middle of the sixteenth century.

It was in connection with this palace that the world-famous Bridge of Sighs was built, but it came more than a century later than the palace. It had been customary to have the state prisons on the ground floor of the Doge's Palace, but in 1588 the Venetians began to build new prisons on the opposite side of the canal, and the bridge was made to let the prisoners pass unseen along one passage in it from the prison to the palace, and back by another passage in it to the prison, where their miserable lives would end. The man who built that bridge built also the famous Rialto Bridge, and he was known as Antonio of the Bridge. Very nearly three years were spent in building the Rialto Bridge, which was finished in the year 1591.

THE FAMOUS BELL-TOWER THAT FELL AFTER STANDING NEARLY 800 YEARS

Not many of the architectural works of Venice can be pointed out as having been done by this man or by that one. Their building took too long, and engaged too many men in successive generations for that. Thus it was with the famous Campanile of St. Mark's, the magnificent bell-tower standing apart from the cathedral. This was ordered by Doge Pietro Tribuno about the year 900, but not until 1131 or later was the main tower finished. It was a noble piece of work, famous in all civilized lands. When, after nearly 300 years, the great summit, or lantern, with its pyramid roof, was added, the whole

structure was about 325 feet in height. The Campanile stood until 1902; then, because of age and alterations, it fell to the ground. The Venetians have since rebuilt it upon the old foundations.

One name which we must not overlook stands out among these old-time architects—the name of Fra Giovanni Giocondo, who was born at Verona, Italy, about the middle of the fifteenth century and died at Rome in 1515. He was a scholar and student all his days, as well as a gifted architect, and many famous men were numbered among his pupils. He traveled a great deal, and worked wherever he stayed.

Thus he built a fine bridge and a palace in Paris; he made a design for the building of St. Peter's at Rome; and he gave Venice some of her noblest palaces; while for Verona he designed a beautiful town hall, or Palazzo del Consiglio. You can see it now, not quite as he planned it, for changes have been made in modern times.

A GLORIOUS PALACE THAT WAS PLANNED IN THE MIDST OF WARS

Another of the men of this era was Michele Sanmichele, who was trained in the school of Bramante, a great artist, whom we meet among the makers of Rome. Sanmichele, like so many other men of artistic genius, was also a soldier, and the work of fortifying cities engaged in the wars of the period occupied more of his time than did art. However, he found opportunity to build for Venice and Verona city gates and palaces which show great power and simplicity. The fine Palace of Grimani in Venice is now used as one of the courts of justice, and remains a noble monument to the man who planned it amid wars and rumors of wars.

A greater architect than Sanmichele then arose in Jacopo Tatti Sansovino, who was born at Florence about 1477, but lived in Venice from 1527 up to his death in 1570. Several churches stand to his credit in Venice, but the work which immortalized him was the building of the famous library of San Marco and the Mint, which adjoins it. He built them at the same time, joining wall against wall, to form the most striking contrast. The library, now called the Royal Palace, is a splendid building, with its two stories, each in a series of arches. It illustrates Sansovino's beautiful use of proportion and graceful ornament.

Next followed Andrea Palladio, who was born at Vicenza in 1518 and died there when sixty-two. After studying the old Roman style of architecture, he brought it back into use in the buildings he planned; therefore his churches and palaces and villas had noble proportions and dignity. The buildings he designed for Venice were all churches or structures connected with churches. The books he wrote about architecture had a great influence upon the work of Inigo Jones, the famous English architect; and Thomas Jefferson gathered from them the ideas which he carried out in the buildings of the University of Virginia.

We must leave the story of the architecture, and turn for a moment to the sculpture. This art in Venice remained chiefly a part of architecture. The architect was sculptor, too. The reasons were twofold. In the first place, the city clung to the examples of the East, which did not provide statues apart from buildings. In the second place, there was a strong desire to keep such open spaces as there were in Venice free from statues.

VENICE AWAKENING TO THE VALUE OF BEAUTIFUL SCULPTURE

The native sculptor counted for so little in Italy that several of the doges in the Middle Ages were buried in tombs which had been carved in the East hundreds of years before. But about the middle of the thirteenth century an awakening began. Farther south than Venice, in Tuscany, Nicola Pisano, his son Giovanni, and the son's famous pupil, Andrea, in their work in marble and bronze for the ornamentation of churches, wrought forms more interesting and lifelike than men in Italy were used to seeing. And these helped to arouse a new feeling in favor of sculpture.

Soon, instead of bringing sculptural decorations from other lands, as they had been in the habit of doing, the Venetians employed their own citizens, or, at any rate, men living in their midst. The first sculptors of note were the Massegne family, who lived in the fourteenth century and the earlier half of the fifteenth century. Next came Pietro Niccolo, of Florence, and Giovanni di Martino, of Fiesole, who worked together and produced, among other things, a fine tomb for the doge who had insisted on continuing the building of the Doge's Palace. Antonio Rizzo, of Verona, who acted as

one of the architects of the Doge's Palace and also carried out important military engineering work, proved himself a gifted sculptor, but did not greatly influence Venetian sculpture.

A GIFTED FAMILY OF SCULPTORS AND ARCHITECTS—THE LOMBARDI

Four generations in a family of architects and sculptors, called the Lombardi because they came from Lombardy to Venice, worked for the beautifying of the city. Pietro Lombardo, the best known of these artists, was truly Venetian in his fanciful and charming sculptured decorations for the Church of Santa Maria dei Miracoli and in other fine buildings which he planned. His sons, Tullio and Antonio, who worked with him part of the time, were not the equals of their father.

In the workshops of the Lombardi many other sculptors received their training, among them being Alessandro Leopardi, whose name is familiar to every visitor in Venice. Born in the latter half of the fifteenth century, he died about 1522, but his fame remains fresh. For two things, especially, is he remembered—the handsome bronze bases for the flagstaves in front of St. Mark's, and the work which he did in connection with the statue of Bartolommeo Colleoni, a famous soldier of Venice who lived in the fifteenth century.

Colleoni's deeds of war are of no account to-day; he is of no more importance to the world than if he had never lived, but he is of interest as having called forth a supreme work of art. He gained great wealth from the wars, and at his death he left money and horses and arms to the state, on condition that a statue should be raised to his memory.

HOW LEOPARDI WAS CALLED BACK TO VENICE TO CAST A FAMOUS STATUE

The Venetians faithfully carried out their part of the bargain. Although Venetian sculpture was making progress, they could not trust one of their own citizens to do this work. They sent to Florence for Andrea del Verrocchio, who is famous as painter, sculptor and goldsmith, and memorable to us as a teacher of Leonardo da Vinci. Having been born in 1435, Verrocchio was forty-four when sent for to make the Colleoni statue, shown among Italy's great sculptures. He had only nine years more to live, and we might fancy that he realized that this was to be his last and greatest work.

He devoted to the task all his strength and skill and art, but death overtook him before he could make the bronze casting of the statue of horse and rider. Soon after he had finished the model, he died. Venice had upon her hands the finest model of a horse and rider that had ever been made in the history of the world, but who was to cast it and set it up? There was only one man—Alessandro Leopardi. But he had fallen into evil ways, and some years before had been driven from the city charged with fraud. In their need the Venetians recalled him to make the casting.

He atoned for his wrongdoing by the way in which he executed this task. The pedestal of marble with a bronze frieze he designed and made himself—a base in every way worthy of the statue.

ONE OF THE NOBLEST MONUMENTS EVER SET UP ON THE EARTH

The statue is still without comparison. Horse and man seem alive. Mr. Ruskin thought it one of the noblest monuments ever set up on the face of the earth. Colleoni rides there, defiant of feature, proud in his strength as a man, fierce and disdainful in his skill as a general. The horse moves heavily, but with great strength, as upon some dreadful battlefield. Leopardi was not satisfied with the fame which the pedestal gave him, but wrote his name upon the girth of the horse, as though the whole design were his. But nothing can rob Verrocchio of the honor of modeling one of the greatest masterpieces in the world.

Yet, after all, the great splendor and wonder of Venice belong to her paintings. There never was another place where a more brilliant kingdom of pictorial art grew up. Venice is as happy in this respect as she is in the beauty of her situation and buildings. Her distinction was not soon won. For a long time she had painters of no special merit—men who painted, not in oils, but in distemper. These pictures were not like life, nor did they express any high ideal. It was just the old kind of Italian art that they represented, wooden-looking pictures done in churches and on the walls of other buildings. Then the Bellini family arose, and with them came new light. The glory of Venetian art dawned at last. The Bellinis began to paint finely in distemper before ever the art of oil-painting had been heard of in Venice.

HOW THE GLORY OF ART IN VENICE DAWNED WITH THE BELLINI FAMILY

The improvement began with Jacopo Bellini, who was born probably about 1400 and died about 1464. Jacopo was a pupil of a famous artist named Gentile da Fabriano, a native of Fabriano, who died in Rome about the year 1428. Jacopo followed his master to Florence, where he met all the great Florentines of the time.

He had two sons. The first, born in 1426, he named Gentile, after his old master. The younger son, born in 1428, he named Giovanni. Jacopo never became a very great artist himself. His work was an improvement upon anything ever done before in Venice, but his chief credit is that he was the father of two notable sons who carried out his admirable ideas in art.

They worked together with him; and all the young artists of Venice who desired to learn all they could about their art flocked to the Bellini studio to become pupils. Giorgione and Titian were of the number. Gentile Bellini painted scenes from the life of Venice; Giovanni Bellini painted religious subjects as Venice had never before seen them painted. Gentile painted portraits, and gained such fame that he was sent for by the Sultan of Turkey and asked to paint his portrait at Constantinople.

THE SAVAGE ACT OF A CRUEL MAN WHICH DROVE BELLINI BACK TO VENICE

Gentile went and painted a famous picture of the cruel man who then ruled over Turkey. This wretch one day wished to show that Bellini had not correctly painted the head of John the Baptist after death, so he drew his sword and cut off the head of a slave standing near. So horrified was the artist that he never rested until he got back to Venice.

But a great change was beginning to show in the art of Venice. An artist named Antonello, of Messina, had come to the city, bringing with him a new art. He had learned from Hubert and Jan van Eyck, the great Flemish artists, their secret of painting in colors mixed with oils. Let us look for a moment at a scene painted for the stage of a theatre; it is done in distemper, the medium in which the artists of Venice had been working. Then let us remember one of the oil-paintings at the Metropolitan Museum, which is the kind of work that Antonello

introduced. It set all the people in Venice wondering.

HOW THE PRECIOUS SECRET OF PAINTING IN OILS BECAME KNOWN IN VENICE

The story runs that Giovanni Bellini went in disguise to Antonello to have his portrait painted, solely that he might learn for himself the great secret. Whatever the truth of this story, we know that the valuable secret was soon mastered in Venice, and that the Bellinis were the first to help make it broadly known through their work. Venice was now glorified by many brilliant works of the brothers. They had the happiness, too, to see young artists promising to become even greater than themselves growing up about them.

But the Venetian authorities feared that death would come too soon and carry off Giovanni Bellini before his work for them was done. Though they paid very poorly for the work, they loved his art, and were determined to get as much out of him as possible. They therefore decreed that he should work every day in one of the great state apartments which he was decorating, and that he should have assistants.

These young men had only four or five ducats a month as payment, and Titian himself was one of the workmen appointed as painters on these terms.

HOW VENICE TREATED TITIAN AND WELCOMED ALBRECHT DÜRER

The document stating the terms of his engagement refers to him with as little ceremony as if he were a poor man called in to whitewash a ceiling, yet he became one of the greatest painters of all time, supreme in the use of colors in oil. The mighty genius of Titian might never have developed in the way that it did had not Jacopo Bellini and his two illustrious sons given a new turn to the world of Italian art.

Gentile Bellini died in 1507, nine years before his brother Giovanni. Both of them had the happiness of meeting Albrecht Dürer, Germany's highly gifted painter. Born at Nuremberg in 1471, Dürer had a hard struggle for education. His father was a poor goldsmith with a family of eighteen children, and Albrecht had for a time to support his aged mother and a brother, as well as his own family. He worked like a slave to master the elements of painting. His father, bitterly disappointed that the lad had wasted his

time by years of study of the goldsmith's art, for which he had no love, at last allowed him to adopt painting as his profession.

There was little money for Albrecht in Nuremberg, but elsewhere others made money by copying his designs and selling the copies as his work. These pirated copies reached even Venice, and it was to prevent this dishonest trading in his productions, and to sell works which were genuinely his, that Albrecht, in 1505, went to Venice. His paintings astonished the Venetians.

HOW ALBRECHT DÜRER SHOWED HIS GENIUS BY PAINTING A LOCK OF HAIR

The younger men were envious and curious. Not so the Bellinis. Giovanni went to Dürer as modestly as if he had been an apprentice, and asked to see the German painter's work. He could hardly understand how some of the things Dürer had painted could have been done. Giovanni asked to see the brushes with which the work had been accomplished. Even then he could not understand, so Dürer picked up one of the brushes, and, while the aged artist looked on, painted a lock of hair so much like nature and so beautiful that it might have been taken from a human head and laid upon the canvas.

Giovanni praised and honored the young German, and gave him an order for his portrait. Dürer's style was broadened and improved by his acquaintance with Italian art, especially that of Bellini, whom he greatly admired. He died at his home in 1528. A great painter and skilled engraver, he was also the father of etching. Here we note him as one of the men whose art helped Venice forward toward the goal to which she was tending.

One of the first of the new school of artists to be influenced by the Bellinis was Vittore Carpaccio. He was born about 1450, and lived seventy-two years. We have seen how the idea of painting scenes of *life* began to take the place of the same subjects painted again and again in the same flat old style. Carpaccio carried on the work in a most interesting way. Some of the painters of his age took subjects from heathen books for their pictures. Carpaccio painted upon his canvases pageant pictures, which told the romantic stories of the lives of saints and heroes; they were made to appeal to the mind and the soul not, like some others, merely to the eye.

Like many other artists of that age, he was always comparatively poor, and we find a curious letter written by him to a rich nobleman describing a panorama picture of Jerusalem which he wished to sell. The picture, he says, was twenty-five feet long and five and a half feet wide, and he wished to send it to the nobleman, "rolled round a piece of wood." Carpaccio had a very satisfying way of painting the settings for his scenes—buildings, costumes and details. They have an "out-of-doors feeling." There is usually a dog in the picture.

A WONDERFUL ARTIST WHO DIED YOUNG AND ONE WHO LIVED LONG

Another great man arose in these days. Soon after the birth of Titian—that is, about 1477—Giorgione was born. Giorgione ennobled and extended the art schemes of his masters, the Bellini family. He not only enriched the city by his frescoes and other paintings, but had a most powerful influence upon the artists of his own day—upon Titian among them, and upon the artists who followed. His art has a flowing, singing beauty, like music and poetry. Giorgione did not attain a great age, but died, all too soon, when only thirty-three.

The name of Titian runs like a bright thread through the tapestry of Venetian story. Born in Cadore among the Alps, Tiziano Vecelli often put rugged mountain landscape into the settings of his pictures. Going to Venice to live when nine years old, there, for the most part, he lived and painted until, in 1576, he died of plague, when almost a hundred years old. He early came to be considered the leading painter in Venice and was honored by rulers from other countries. For the emperors Charles V and Philip II he painted splendid portraits and other works. When nearly seventy, he went to Rome at the request of the pope. For Venice he painted portraits of the doges, besides large pictures to adorn the ducal palace and various churches.

A NEW AGE OF WEALTH AND ARTISTIC SPLENDOR IN VENICE

This was a remarkable age for Venice. Every rich man was willing to employ artists. They may not have paid well, but there was no very serious competition. And we find Giorgione and Titian and others painting lovely works on articles of furniture, and other artists rivaling the goldsmiths in the splendor

with which they decorated the outside of buildings with the glories of the brush.

Some of the artists would do anything for money, and Titian was, perhaps, the most grasping of them all. Much as we may admire his works, some things indicate that the nature of the man was far from lovely. His meanness is most noticeable in the story told of his treatment of Tintoretto. This artist's real name was Jacopo Robusti, and he was born at Venice in 1518 and died in 1594. His father was a dyer—a *tintore*—and so they called Jacopo, his son, Tintoretto, or Tintoretto, meaning the "little dyer." The clever boy was a born artist, as was soon to be discovered.

He used to dabble in his father's dyes and to splash the colors all over the walls and furniture until his parents must have found him a nuisance. Seeing which way the lad's genius was inclined, the father took him to the studio of Titian. Jacopo's apprenticeship lasted no longer than a few days.

Titian, the story goes, went into the studio one morning and saw, lying on the floor, papers covered with drawings. He picked them up and asked who had done them. Little Tintoretto shyly confessed that he had. Titian saw that they were the work of a genius; he saw that this boy might soon become a rival to himself. He left the studio at once, and that same day had the ambitious boy turned out.

HOW TINTORETTO PAINTED PRICELESS PICTURES ON THE WALLS OF HOUSES

It was a hard experience, but young Tintoretto was not to be beaten. His life became a miracle of activity. He set before himself two models—Michelangelo for design, Titian for color. Wherever he could see a work by either of these two he studied it. He copied antique statues. He made numberless drawings to perfect his style. He studied the human frame as a whole and in its various parts.

He made models of wax on which to hang draperies for the figures he meant to paint. He copied tombstones and bits of broken statuary. He studied the methods of every artist in every studio into which he dared to peep. He went down into the square where the poor painters worked who painted common furniture and cabinets for sale, and studied how they got some of their effects. He followed the work of architects. He used to beg builders to let him decorate

MEN WHO MADE VENICE BEAUTIFUL



Some of the greatest painters the world has ever seen helped to make Venice beautiful, among them Albrecht Dürer, a German artist, seen here in his studio at Venice. He went to Italy to improve himself in painting, but the Italian artists learned much from him. He painted a fine picture—The Martyrdom of St. Bartholomew—for St. Mark's, but this was later bought by an emperor of Germany.



Paul Veronese was one of the Italian artists who learned much from Albrecht Dürer, and some of his best work is to be found in Venice. The frescoes painted by him on the ceiling of the Church of St. Sebastian are called by the Italians "the glory of Veronese." Here are two portraits of Veronese by himself. The first shows him as a hunter, the other is from *The Feast in the House of Simon*.

houses which they were erecting. Once he painted designs all round a clock which the builders were erecting in a tower. Another builder was putting up a new house, and Tintoretto insisted on painting the walls with lovely frescoes, simply for the cost of the materials he used. He would do paintings for chapels and churches and other buildings and charge practically nothing.

A MASTERPIECE THAT WAS PAINTED ON A CEILING IN A FEW DAYS

He did anything and everything to perfect his art and make his name known. He worked with marvelous speed, and, of course, the effect was not always good. They called him "Il Furioso" (the fiery one). But in time he made a very great name, and became one of the greatest painters of all time. One story will show his passion for work, and some of his astonishing ways.

The ceiling of the San Rocco School was to be decorated with a painting, and the artists of Venice were asked to send in sketches for the work. There were not many days for the preparation. The other artists made their rough plans. Not so Tintoretto. He had the space measured, and, with that zeal and speed which nobody could match, he painted his whole picture, and had it secretly fixed up on the ceiling and covered over.

When the day of trial came, the others showed their sketches, while Tintoretto stood by. At last he twitched aside the linen covering the ceiling, and the company saw his splendid picture already fixed. Everybody was amazed. The authorities, when they recovered their breath, protested that they had asked only for designs, not for a finished picture.

THE WONDERFUL PAINTING THAT MADE THE AUTHORITIES OF VENICE ANGRY

The other artists, however, examined the work, and, seeing how great and exquisite it was, they withdrew from the competition. But the authorities were very angry indeed, and still grumbled furiously.

"Oh, very well; there is the picture!" said Tintoretto. "If you will not pay me for it, then I will make it a present to the saints."

After that the city authorities calmed down, and, deciding that the work was one of rare merit, they at last agreed to pay the artist fairly for it.

The last of the greatest Venetian painters was Paul Veronese. He was born in 1528 at Verona, whence his title, his real name being Caliaro, or Cagliari. He lived in Venice from 1555 till his death, in 1588. His pictures glow with the brilliance of coloring which belongs to works of the great Venetian school, but he had caught the spirit of painters in Rome, and gave to his work greater splendor, more grace of pose and ease of movement than had been introduced before his day.

Paul Veronese was a painter more for the palace than the church. His scenes were scenes of splendor, of great space and riches and luxury, so that it has been said that one of his paintings would convert a garret into a palace of vast size and delight. He was a great worker, but different in type from Tintoretto, taking careful pains with all that he painted, yet with no display of effort or cleverness. He was the portrait-painter of a people even more than of the individual.

THE GLORY THAT HAS GONE FROM VENICE AND THE GLORY THAT REMAINS

In the Louvre at Paris hangs his picture called *The Marriage Feast at Cana*, showing no fewer than 160 portraits of people who lived in Venice in his day. This is a fine example of the pageant-like pictures which Venice loved—pictures presenting themes from the Bible or old story in scenes of Venetian glory. In it, too, we can see how a feeling of the importance of a decorative plan guided the brush of the Venetian painter over wall-space or canvas.

With the death of Paul Veronese the sun of the best Venetian art set. But the afterglow has lighted the world for more than three hundred years, firing the enthusiasm of all the artists who have lived since.

While the glory of Venice as a maritime power, holding a great part of the commerce of the world in her hand and forming a link between the East and the West, is departed forever, her more lasting glory as a patron of the highest and best art will never die. For the color and gleam of the rich fabrics, the jewels and the gold that came into Venice from the East were caught up into the thought of the painter, and set forth in gorgeous effect upon wall or canvas with a touch at once easy, broad and sure.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 1611.

VENICE IN ALL HER GLORY



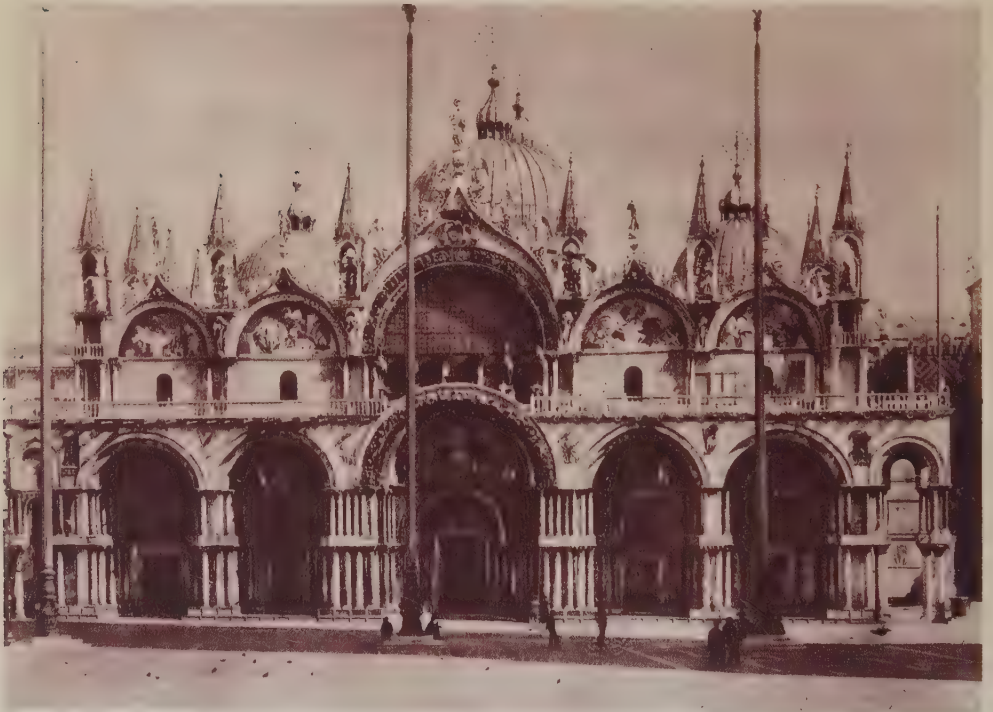
VENICE—QUEEN OF THE ADRIATIC



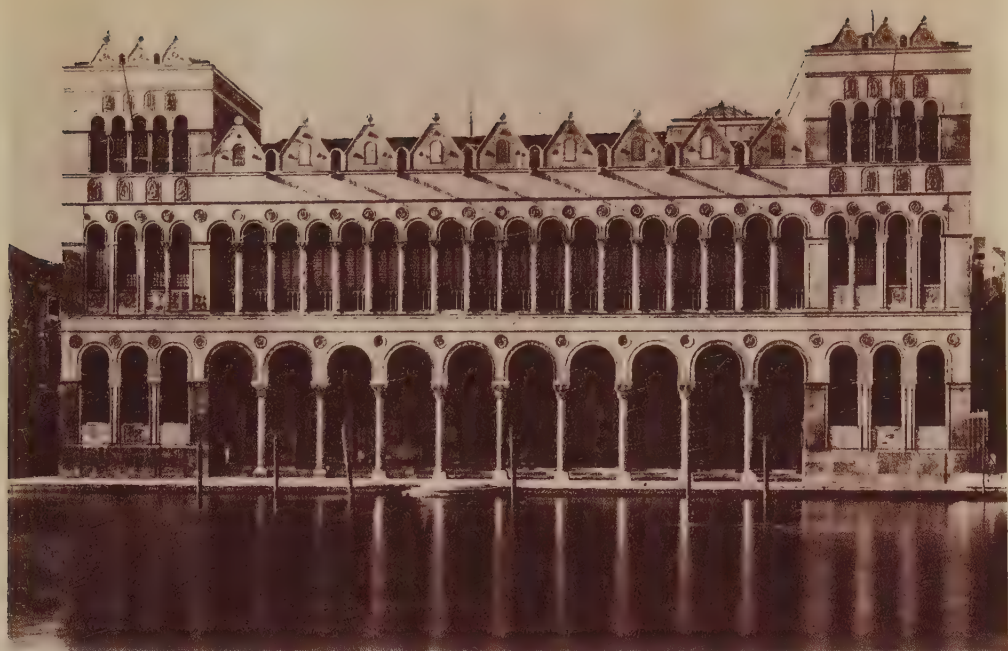
THE DUCAL PALACE THAT HAS STOOD FOR SIX CENTURIES



THE SQUARE OF SAN MARCO WITH THE OLD CAMPANILE THAT FELL DOWN



SAN MARCO, THE MARVELOUS DOMED CATHEDRAL OF VENICE



THE LOVELY COLUMNS OF A VENETIAN PALACE



RARE TWELFTH-CENTURY WORKMANSHIP ABOVE THE DOORS OF SAN MARCO



A SQUARE IN VENICE



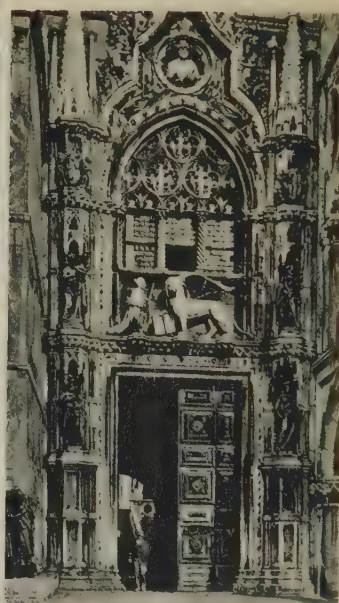
THE OLD COLUMN OF
ST. MARK



THE COLLEONI MONUMENT



A STAIRWAY IN THE MINELLI
PALACE



DOORWAY OF THE DUCAL
PALACE



ONE OF THE BEAUTIFUL DOOR-
WAYS OF SAN MARCO



A FIGURE IN A CHURCH
OF VENICE



THE BRIDGE OF SIGHTS BETWEEN
PALACE AND PRISON



Planting wheat with drills in the West.

WHAT MAN CAN DO WITH A PLANT

LET us carry a little further our study of the marvelous changes man has brought about in the plant world. A fine example of what changes come about under man's guidance is to be found in the story of wheat. It is well known that prehistoric man, still using polished stone weapons, grew wheat. There were harvests from ten to fifteen thousand years ago, and it is not unlikely that the first great wheat-fields were in the fertile land between the Tigris and the Euphrates. It is plain, then, that wheat is a cultivated plant of very long standing, but scientists were unable to find the wild plant from which our wheats developed.

In the beginning of the twentieth century Mr. Aaron Aaronsohn, the director of the Jewish Agricultural Experiment Station in Palestine, discovered a wild wheat growing on the dry and rocky slopes of Mount Hermon. He advanced the theory that this is the ancestor of all the various wheats of to-day except the one called *einkorn* (one grain), which stands in a class by itself. Many scientists agree with him, though not all are convinced.

It is believed that the Hermon wheat gave rise to the *emmer* wheat, which the men of the later Stone Age cultivated. From the emmer wheat all the ordinary wheats of to-day seem to have

CONTINUED FROM 1300



come. It is interesting to think of our ancestor of long ago noticing the big seeds of the Hermon wheat, gathering the heads, knocking off the rough beard, bruising the brittle spikelets in his hands, blowing away the chaff, and then chewing a mouthful of the grains. He liked them so much that he made up his mind to sow some, and we may suppose that this was the beginning of the cultivation of wheat.

There are some interesting differences between the wild wheat of Hermon and its descendants. Its flowers are suited, like those of most grasses, for pollination by the wind, whereas most of the cultivated wheats pollinate themselves. What usually happens is that the stamens of the little flowers about the middle of the ear suddenly project on a warm summer morning and dust the pistil of the same flower. The same thing happens upward and downward on the ear during the next four days, till all the flowers are pollinated.

The wild wheat of Mount Hermon is distinctly grassy; it has a rather short stalk, it bears drooping, long-bearded heads, and the stem running up the centre of the ear is very brittle. It easily breaks into little pieces, and this helps in the natural scattering of the seeds. As this fact would not help

threshing, man has been able, in the course of time, to replace the brittle centre of the ear by a tough and rigid one which suits *his* purposes better, though it would be a disadvantage if the wheat were self-sown.

Man breeds wheat or other plants just as he breeds cattle. He seeks to introduce and to fix the qualities he values. This can be done in two ways: by selection and by combined crossing and selection. In selection, a man finds a head of wheat which seems a little better than its neighbors in some respects. He plants all the grains from this head. When they grow and mature, he again selects the best head or heads. Again he plants and selects, and perhaps again and again, until he has a wheat which has some point, or points, of superiority over the common varieties. This superiority may be in amount of yield, in quality of the flour, in stiffness of straw, in resistance to rust or drought, in early maturity, or in some other desirable quality.

Wheat is usually self-pollinating. This means that both stamens and pistils (male and female parts) are present in the same flower. However, it is possible for the wind to carry pollen from one plant to another. It is probable that some of the heads which seem to show superiority, and are therefore chosen for selection, are really the result of natural crossing.

HOW A PLANT-BREEDER MAKES HIS CROSSES

The plant-breeder who sets out to make new varieties does not leave the crossing to chance. With great care he carries the pollen of one variety to the pistils of another, and watches the resulting crosses. The results from such crossings are not all alike. Some stalks seem to resemble one parent, some the other. Some seem to show the bad qualities of one or the other, or both. Some have one or more good qualities of one parent with the bad of the other. A few show good qualities from both parents. Such heads the breeder takes and plants and selects, and repeats until he knows whether he has really found something better than either of the parents.

Wheat has been improved in both ways. Ever since wheat was first grown there has been more or less selection in many lands. Now several hundred distinct strains are grown, more or less,

somewhere in Canada or the United States. There are many other varieties in all lands where wheat is grown. Many European and even Asiatic wheats have been brought to America for trial.

THE INTERESTING STORY OF RED FIFE WHEAT

One of the most interesting stories is that of Red Fife, a hard spring wheat much grown in the West. About 1842 David Fife, a farmer of Otonabee township, Ontario, received a small sample of wheat from a friend in Glasgow. The wheat had been bought in Germany, but was supposed to have been grown in Russia. Recent trials show that a wheat grown in Galicia seems to be practically identical. Mr. Fife planted the sample, but most of it proved to be winter wheat, and therefore useless for his purpose. One stalk, however, was different, and from this the variety known as Red Fife was developed. For many years this was the leading variety of hard spring wheat cultivated in the West. By careful selection many strains have been developed and given special names. However, in some parts of Canada frost sometimes caught this wheat before it was quite ripe, and there was need for a variety which would have the good qualities of Fife but would mature a little earlier.

Apparently the first man to cross wheats on a large scale was C. G. Pringle, of Vermont, in 1877. Several of the varieties he developed are still grown. Professor A. E. Blount, of Colorado, followed, and some of his wheats are much grown on the Pacific coast and have been introduced into Australia.

About 1888 Dr. William Saunders, then director of the Experimental Farms of Canada, began crossing wheats. In this work he had at times the assistance of his two sons, A. P. Saunders and Charles E. Saunders, both graduates of the University of Toronto, and both of whom later took the degree of Doctor of Philosophy at Johns Hopkins University. Very soon several new breeds of wheat were established and were named Preston, Stanley, Huron and Percy. None of these was the ideal wheat, though they are still grown to some extent.

HOW MARQUIS WHEAT WAS DEVELOPED

In 1903 Dr. Charles E. Saunders was appointed Dominion Cerealists and con-

tinued the family work at Ottawa. The crosses which resulted in Pioneer and Prelude (a very early wheat) were made this year. The next year he began examining the many crosses already made on the experimental farms, nearly a hundred in all, and selected several of them as worthy of further trial.

In one little plot of ground on which the grains from one head were planted, twelve plants grew. The heads on these plants ripened early, had plump grains, good color, strong straw, and seemed to



Charles E. Saunders was born in London, Ontario, in 1867, and was educated at the University of Toronto and Johns Hopkins University. He became Dominion Cerealists in 1903 and developed Marquis and other wheats.

have good gluten. The wheat was named Marquis, and selection was continued. In 1906 Dr. Saunders had two-thirds of a bushel of this new wheat, and bread was made from some of it. The result was very satisfactory. In 1907 and 1908 tests were made on the experimental farms in Saskatchewan and Manitoba. In 1909 four hundred samples were sent to farmers, and the wheat was also grown on all Canadian experimental farms. The reports were enthusiastic, and by this time there was enough of the wheat to supply many farmers. Soon it was the chief wheat grown in Canada.

Farmers in the United States near

the Canadian border, where conditions of soil and climate were similar, heard of the new wheat and bought seed. In 1913 some of the large flour-mills in the United States bought thousands of bushels which they either gave to the farmers or sold them at cost. In 1914 at least seven million bushels of Marquis were grown in the United States. It was so satisfactory that the quantity has steadily increased, until it is now the most popular spring wheat in the United States also.

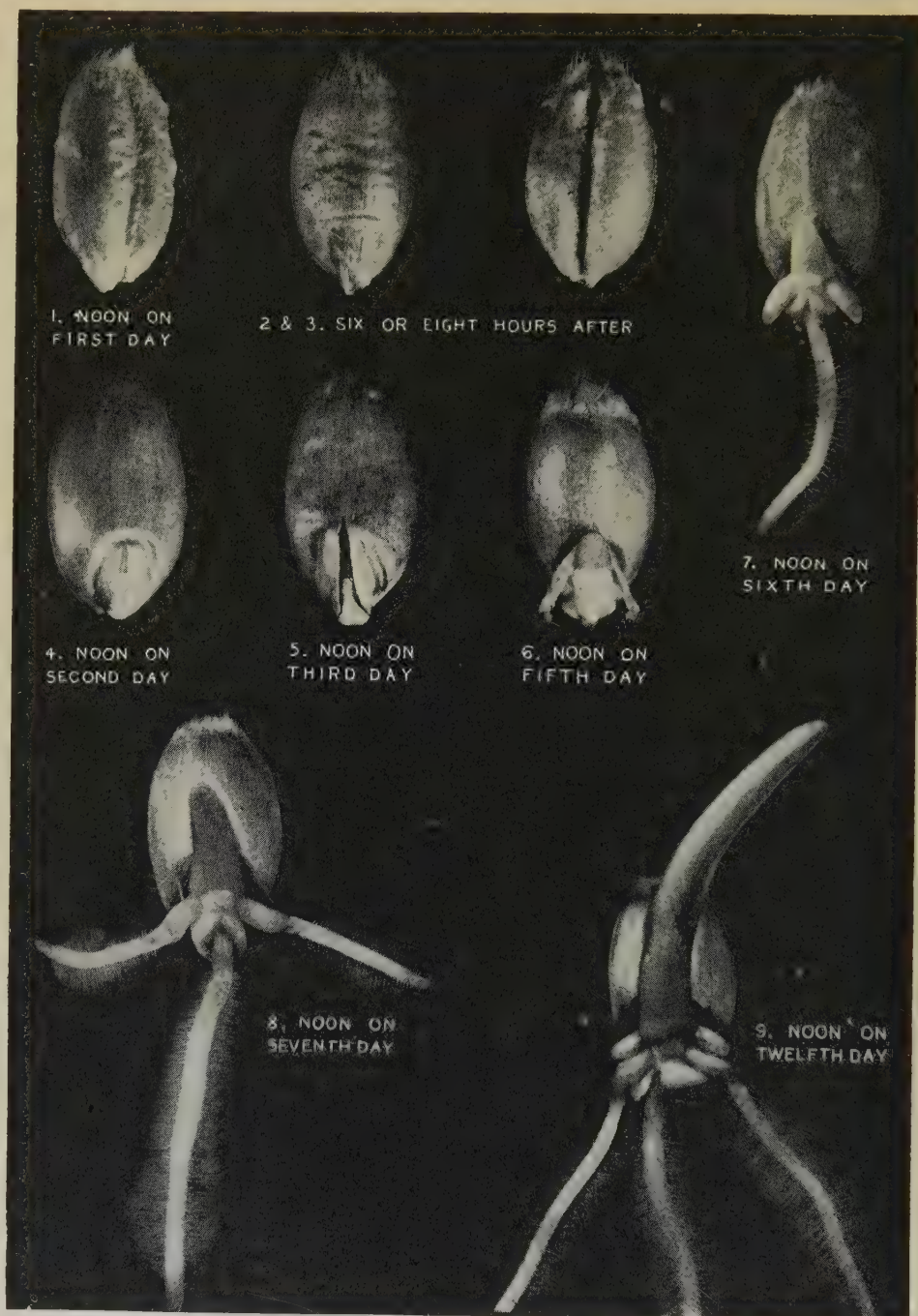
THE TWO PARENTS OF MARQUIS WHEAT

We have said that Marquis is a hard spring wheat. This means that it is sown in the spring and ripens in the autumn, and that the percentage of gluten is high. What this means we have told you in *The World's Bread and Butter*, on page 371, and in the *Story of Wheat*, on page 1755. It yields well, has strong straw, and makes excellent flour and bread. In fact, it is often used as a standard by which other wheats are measured. Hundreds of millions of bushels are grown every year, and yet in 1904 all the wheat of this variety in the world was stored in an envelope.

Marquis wheat is now the most valuable food plant in the world. How did it come to be? Apparently the actual cross had been made by Dr. A. P. Saunders in 1892. One parent was Red Fife, of which we told you above. The other was Hard Red Calcutta. This was an East Indian wheat which ripened early but did not yield well. The plants grown from this cross were very different, and many were worthless, but among them was the one which, through careful selection by Dr. Charles E. Saunders, has made the name of the family famous wherever wheat is grown.

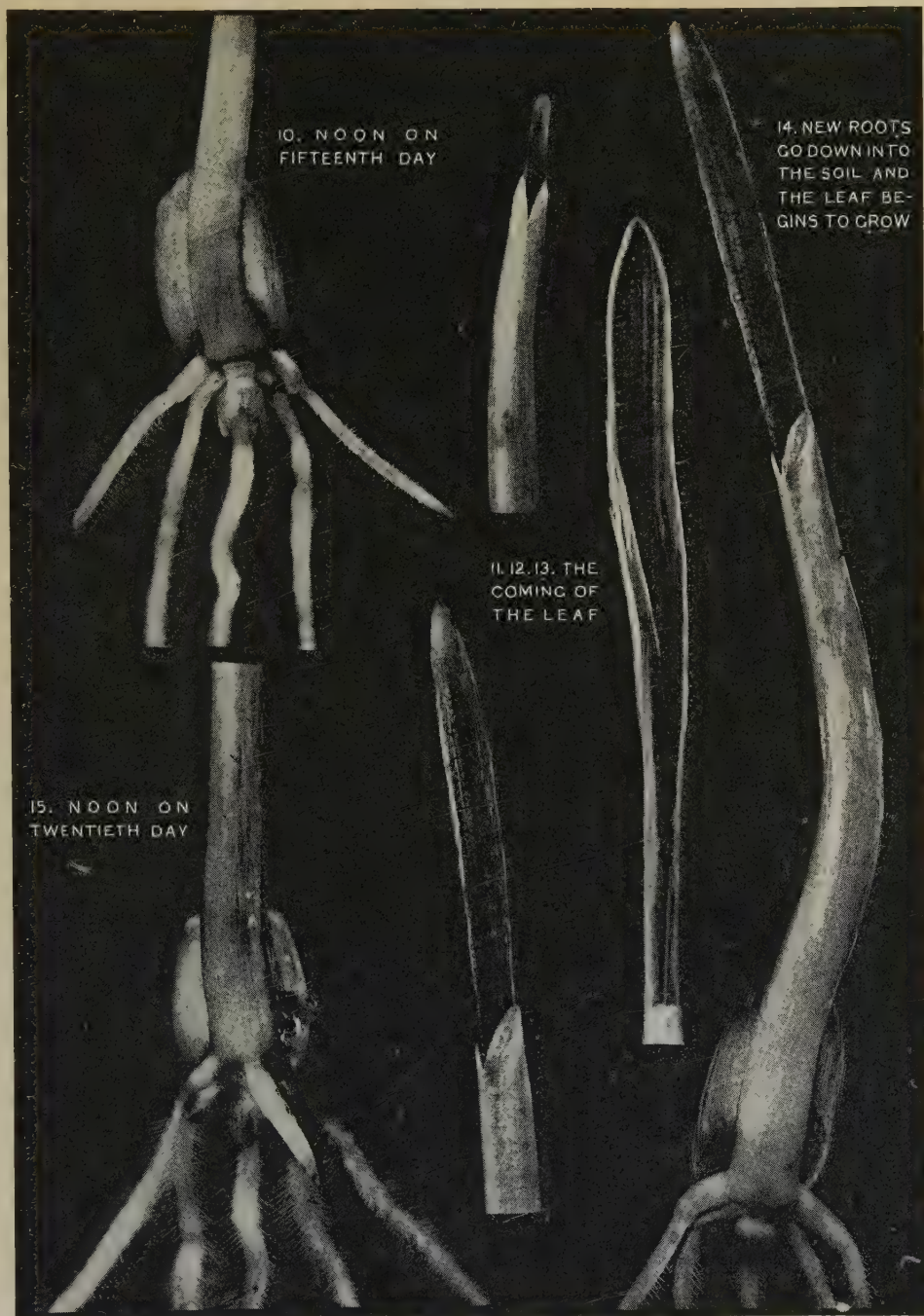
Though Marquis is an early wheat, the growing season in parts of the Prairie Provinces is not long enough to allow it to ripen every year. Two other wheats which Dr. Saunders has developed, Prelude and Ruby, ripen earlier, and by sowing them wheat can be grown farther north than was thought possible a few years ago. The work of Dr. Saunders has added many millions of dollars to the wealth of Canada and the United States. In 1925 he was awarded the gold medal of the Royal Society of Canada for his achievements in plant-breeding.

THE WONDERFUL BIRTH OF THE WHEAT



One of the wonders of the world is the growth of the wheat. The grain in picture 1 was sown in wet sand at noon one day, and if we follow the pictures it is easy to see the great marvel. At the bottom of the grain in picture 2 is a little raised part. This is the germ, or real seed; the rest is a store of food to feed the seed until it can find food for itself. The channel down the middle in picture 3 is a little river-bed which brings the water to the seed. On the third day appears a sheath which guards the root in its early life, and on the fifth day a young shoot strikes out from the other end of this sheath. On the seventh day we notice that the root has grown down into the earth, sending out little white hairs to search for moisture.

HOW WHEAT TAKES LIFE FROM THE EARTH



The tip of the root of wheat is a wonderful thing; it takes in what it wants from the earth and rejects what it does not want. On the twelfth day we see the beginning of two further roots, which grow remarkably by the fifteenth day; so that our baby plant has now five roots, all working in the earth for its benefit. All this time the plant is growing at the top, and we see the leaf come forth. This is about the sixteenth day, and the leaf grows as seen in the pictures. Of the wonderful way in which the roots take in food from the earth and build it up into wheat, we read on page 613. These photographs show us how the grain planted in the earth takes to itself new life, until it reproduces itself, some 30, some 60, and some 100 fold.

ANOTHER CANADIAN WHO HAS WORKED WITH WHEATS

Though Dr. Saunders deserves all the praise we have given him, you must not think that he is the only man in Canada that is helping to increase or improve the food supply of the world. There are others who deserve mention.

For example, Mr. Seager Wheeler, of Rosthern, Saskatchewan, obtained some seed of Bobs, a white wheat developed in Australia. He found a few heads which had red kernels; he planted them and continued the selection for several years. The final result was Red Bobs, which Mr. Wheeler and some others think is superior even to Marquis. Mr. Wheeler, by selection from Marquis, has also developed another variety, which he calls Kitchener and which has won him many prizes. Other Canadian wheat-breeders have also done good work.

Now let us turn to the United States, where many men, under direction of the state and national governments, are working on cereals and other field crops. Except in the western states bordering upon Canada the need for an early spring wheat is not so great. In fact, winter wheat, sown in the fall and reaped in the early summer, is more popular in the United States, because generally the yield per acre is higher, as it has a longer growing season. For some purposes, as for making crackers and pastry, it is better than the hard spring wheat, though it does not make so light a loaf. Some winter wheats, however, are quite hard and make excellent bread, and the story of one may be put beside that of Marquis.

KANRED WHEAT AND THE MAN WHO DEVELOPED IT

In 1906 Professor H. F. Roberts, of Kansas, began selecting from five hundred heads of a wheat that had been brought from Russia. For ten years he worked, selecting the heads that seemed superior, and then Kanred wheat was offered to the farmers. This wheat makes almost as good bread as hard spring wheat, and the yield is slightly larger. It also resists rust well. Spring wheat does not grow well in the region where Kanred flourishes.

Many other experiments with wheat and other cereals are being made. Durum wheat, a very hard wheat used in the manufacture of macaroni, is widely grown in the United States, but not much

is grown in Canada. Most varieties of this were originally brought to America from Russia, and much attention is being given to selecting the best. Many other men are also working to improve the winter wheats.

SOME INTERESTING EXPERIMENTS WITH CORN

Not many years ago corn did not always ripen in the northwestern states. Professor Boss of the University of Minnesota about 1890 began selecting specimens for earliness. He was finally successful in producing corn which ripened at least a month earlier than the ordinary varieties. As a result of his work and that of other men working toward the same end, millions of bushels of corn are now grown in states, or parts of states, in which frost usually came before the corn was ripe. Much early corn is grown for fodder in the Prairie Provinces, though the ears do not usually ripen. Experiments are still going on, however, and it is possible that corn may yet be grown successfully in this section of Canada. Certainly with both wheat and corn the limit of cultivation has been pushed much farther toward the north in recent years. This means a great increase in the food supply of the world.

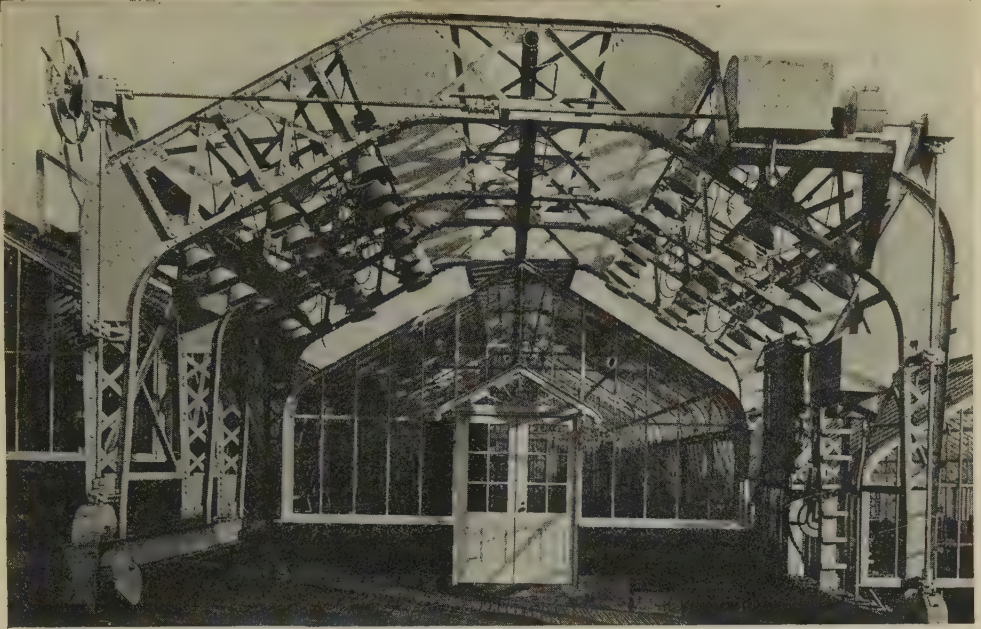
Such is the story of our modern wheat, and we have seen what happened with many other flowers and plants. It may be asked, after all these stories of man's use of the novelties nature puts into his hands, what there is in nature to take the place of man the cultivator. The answer is that *the struggle for existence* is the sieve.

THE DIFFICULTIES THAT EVERY PLANT HAS TO FIGHT AGAINST

There are difficulties and limitations besetting every plant, and the plant is at heart a struggler for life. There are the changes of seasons and of climate; there are competing neighbors and hungry animals; there are difficulties in the soil, as on the moorland, and limitations in the water supply, as in the desert. Pollinating insects may be scarce, or seed-distribution may be a hard problem to solve. Now, those plants which show distinctly useful new departures will tend to be the survivors, and if they hand on their good qualities to their offspring, the race will move in that direction.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 1623.

STUDYING THE EFFECT OF LIGHT



Scientists are studying every factor in plant life, and some interesting experiments are being made to discover the effect of different amounts of light on plants. This gantry crane carries forty-eight 1000-watt lamps and can make a room as light as day. It can be run to any part of the great greenhouses.



This picture shows the effect of varying amounts of light on tomato plants. The plant in the left had a day of only five hours, while the sixth had a day of twenty-four hours until it died, apparently because it did not have a daily period of rest. The fifth plant lived but bore no fruit. The plant on the extreme right was grown under natural light.

Courtesy Boyce Thompson Institute for Plant Research, Inc.

ON HIGH STOOD UNABASHED DEFOE



Placed in the pillory for writing a pamphlet ridiculing the treatment of Dissenters, Defoe was admired by all the people and scored a great personal triumph.



The Old Prison on Bedford Bridge, where Bunyan probably wrote his *Pilgrim's Progress*.

JOHN BUNYAN AND DANIEL DEFOE

ALREADY we have said that in the writing of the English language, in the centuries when it had become nearly what it is now, there were two styles of prose, the learned and the simple styles.

There are some fine English books in the learned style, as, for example, Sir Philip Sidney's *Arcadia*, written in the reign of Queen Elizabeth, and Robert Burton's *Anatomy of Melancholy*, written in the reign of James I, and Milton's *Areopagitica*; but we shall follow rather the course of English prose that is great in its simplicity.

Happily from the first a lovely strain of simple English prose was sustained. Thus, just before Shakespeare's time, such men as Latimer, the martyr bishop, and Cranmer, who drafted the beautiful English Prayer Book and also was a martyr bishop, and Roger Ascham, the schoolmaster of Queen Elizabeth, and George Cavendish, who wrote the life of Cardinal Wolsey, were all writers of an English style worthy to be ranked with the choice simplicity of Thomas Malory and the English Bible.

And in Shakespeare's own day Richard Hakluyt, who collected accounts of early English voyages, showed the charm of simple writing, while we remember even the famous Francis Bacon by reason

of his plain rather than his learned writings.

But none of these writers, who helped to establish a style of English prose that is plain and strong, and suited for occasions either commonplace or great, was popular in the widest sense.

It could not be said of them that everybody in a growing multitude of readers read them. This was reserved for two men, living about forty years apart, who conquered the whole reading world of their day and have remained very popular ever since: John Bunyan and Daniel Defoe.

John Bunyan was in some respects the most remarkable man that ever gained immortal fame by the use of a pen. He was an uneducated tinker, son of a traveling tinker, and he had a rough but short soldier life behind him when he became a serious seeker after the peace that sincere religion brings.

Two incidents are mentioned by him as turning-points in his young life. One was a conversation about the blessings of religion between two pious, poor women sitting at their cottage door while he worked at his trade in the lane close by; and the other was his wife bringing into their scantily furnished house two religious books when they married. Probably these books marked the great turning-point

CONTINUED FROM 1359



in the life of Bunyan and put into his mind the idea of writing books himself.

One of the first and best books that John Bunyan wrote, *Grace Abounding*, was a sketch of his own early life. It contains many of the qualities of his later works; but it must not be accepted without reserve, for Bunyan's description of his conduct as a young man, and his "sins," as he called his doings, is the pricking of a very tender conscience.

BUNYAN MENDS KETTLES BY DAY AND PREACHES BY NIGHT

There is no doubt that John Bunyan believed himself to have been a very bad young man, and that he had a long and anxious wrestle with himself—or with Satan, as he thought—before he became an active Christian and an eager and popular Nonconformist preacher.

He had been a vigorous, worldly-minded youth, fond of sports, and a victim to the bad habit of coarse language, but he was only twenty when he married the thoughtful wife who brought him books to read and was a companion in his search for a better life. When he was twenty-seven his wife died, leaving him with four little children, one blind. He was now a lay-preacher, and years later he was ordained a regular minister.

But this change did not alter his mode of life. Like the apostle Paul, he earned his living by the work of his hands while preaching the Gospel in all the country round. By day he mended kettles and pans, and by night drew crowds to hear his homely teaching of the Christian faith. At the same time he began to write, and when he was thirty had published three books, all plain and vigorous in expression and brightened by humor.

THE IMMORTAL BOOK WHICH JOHN BUNYAN WROTE IN PRISON

Then came the Restoration of the Stuart kings, and persecution of men who preached the Gospel openly, unless it bore the official stamp of the Church of England. John Bunyan was not the man to be daunted by persecution. Of course he went on preaching. He was respected, and he was popular, and the local justices shirked taking on themselves the shame of punishing such a man, as they might have done, so they shut him up in prison to prevent his breaking the law he would not undertake to keep; and through the troublous times that followed twelve years of Bunyan's life were spent in prison.

Bunyan had married a second time, with results as happy as those of his first marriage. His wife proved herself a fit mate for a noble-minded man. She was unceasing but unsuccessful in her efforts to secure his release; but his imprisonment for a considerable part of the time it lasted was not strict. He was allowed out occasionally to preach to his Bedford congregation, and he regularly ministered to the prisoners in the jail. Earning his living by making and tagging laces, he also found time to write a number of books that kept his reputation high among the public who were free. In prison he wrote *Grace Abounding*, one of his three immortal works.

His masterpiece, *The Pilgrim's Progress*, was not written during the first twelve years of his imprisonment in the county jail, but during a later six months' imprisonment in the town lock-up. It was published in 1678, twelve years after *Grace Abounding* and four years before his third great book, *The Holy War*.

THE SECRET OF THE TINKER'S STORY OF THE PILGRIM

After his release from his long imprisonment Bunyan lived nearly sixteen years, preaching and writing books. Much of his work was done still around Bedford, but the desire to hear him was universal, for he was before his death the most popular author in England. It is recorded that in London 1,200 people would assemble to hear him preach at seven o'clock on a cold winter morning; and he came by his death through riding post-haste from Reading through a storm to London to make peace in a quarrelsome household. The tinker-preacher had become indeed a national character, and his *Pilgrim's Progress* was already beginning to be felt as a glory to English literature. Since his time it has been translated into seventy languages.

The secret of this great book is that a man with great power of imagination and religious feeling of high intensity found the means of expressing his vision and his faith in the language of the Bible. He used the common speech of his day, so refined as to preserve dignity without ever losing extreme simplicity.

John Bunyan never wrote a page that anyone of ordinary intelligence could not understand; but he wrote hundreds of pages which by their perfection in style and thought will charm forever students of the literatures of all nations.

The secret of his writing was the secret of his power as a preacher. It was his complete sincerity that captured his audiences. Here is a description of him by one of his hearers. "His countenance was grave and sedate, and did so to the life discover the inward frame of his heart, that it was convincing to the beholders, and did strike something of awe into them that had nothing of the fear of God."

That is a picture of a man entirely sincere and therefore at once accepted by the "beholder." And that same sincerity

also his experience as a writer had extended, and he became more eloquent, though still without being artificial.

Though *The Pilgrim's Progress* is an extended parable, yet we may read it simply as a tale and get someone perhaps to explain its deeper meaning. That is why both children and grown-ups can enjoy it. As an example of its style we take some extracts from the close of the Pilgrim journey, where Christian and his friend Hopeful find themselves within sight of the Celestial City, but separated



Bunyan and his wife reading by the fireside in their cottage near Bedford.



Bunyan parting with his wife and children before going to prison.

appears in every line of Bunyan's writing. He cannot make any pretense. To try to write in a fine way would, to him, be insincerity. He must say what he feels and believes in the simplest words, having the clear ring of reality in them. The effect of this way of writing is that even when scenes that are purely imaginary are described, dealing with characters that are only the children of fancy, like Giant Despair, the feeling about them is intensely real. They live.

In his later book, *The Holy War*, Bunyan became more involved than in *The Pilgrim's Progress*. His plot was much more complicated and difficult to manage;

from it by a dark and daunting river, the River of Death.

Now I further saw that betwixt them and the gate was a river, but there was no bridge to go over; and the river was very deep. At the sight therefore of this river, the pilgrims were much stounded; but the men that went with them said: "You must go through, or you cannot come at the gate."

The pilgrims then, especially Christian, began to despond, and looked this way and that; but no way could be found by them by which they might escape the river. Then they asked the men if the waters were all of a depth. They said: No; yet they could not help them in that case; for said they: You shall find it deeper or shallower, as you believe in the King of the place.

They then addressed themselves to the water, and entering, Christian began to sink, and crying out to his good friend Hopeful, he said: "I sink in deep waters; the billows go over my head; all the waters go over me."

Then said the other: "Be of good cheer, my brother; I feel the bottom, and it is good." Then said Christian: "Ah! my friend, the sorrow of death hath encompassed me about; I shall not see the land that flows with milk and honey. . . ."

Then I saw in my dream that Christian was in a muse a while. To whom also Hopeful added this word: "Be of good cheer; Jesus Christ maketh thee whole"; and with that Christian broke out with a loud voice: "Oh, I see him again; and he tells me: 'When thou passest through the waters, I will be with thee, and through the rivers, they shall not overflow thee.'"

Then they both took courage, and the enemy was after that as still as a stone, until they were gone over. Christian therefore presently found ground to stand upon, and so it followed that the rest of the river was but shallow.

John Bunyan and Daniel Defoe rest together in the ancient Nonconformist cemetery of Bunhill Fields, off the City Road, in what is now central London. They are alike only in two respects: both were Nonconformists (that is outside the Church of England), and both wrote their native language with pure simplicity.

AUTHOR OF ROBINSON CRUSOE AND FOUNDER OF JOURNALISM

Daniel Defoe was a Londoner born, who was educated to be a Nonconformist minister, but turned aside first into business and then into politics and journalism.

Unquestionably Defoe, who wrote the immortal Robinson Crusoe, was the founder of English journalism. He was the first man of note who combined the professions of journalist and political agent. A journalist is one who writes on topics of the day in which everyone is interested. The word comes from the French *jour*, day. Whether it was party politics, or religion, or finance, or trade, or family life, or business, or ghosts, or gossip, or the lives of people who were being talked of, be they soldiers, or discoverers, or highwaymen, or kings, Defoe immediately produced a life of them for everyone to read.

He began with pamphlets; then he went on to start a newspaper of his own, once a week, twice a week, thrice a week as the demand for his work grew; and all the while he was working with one or other of the political parties, changing

sides from time to time, though it is clear now that his real sympathies were with the Whigs, who were the forerunners of the party now called Liberal.

It was during his early pamphleteer stage that Defoe had his great adventure in the pillory. A "burning question" of the day was the position of Nonconformists, or Dissenters. They had been in power during the Commonwealth, but were suppressed, as far as might be, by law after the Restoration of the Stuarts.

THE NARROW-MINDED PEOPLE WHO PERSECUTED THE DISSENTERS

A curious point was that the Dissenters, as they were called, did not object greatly to the laws which kept them in check publicly, for the Roman Catholics were also Dissenters from the Church of England, and were kept in check by the same laws that applied to Independents, Baptists and Quakers. So, curiously enough, many Nonconformists were content to suffer for what they thought was the public good.

This was well understood at the time, and the law was lightly applied, as in the case of Bunyan, by men who did not believe strongly in laws restraining religion. Still, some one-sided people were glad to persecute anybody who disagreed with themselves, whether they were Dissenters or Catholics. Defoe was a Dissenter and detested these narrow persecutions. His way of writing when he attacked anyone was ironical. That is, he would write as if he favored the cause he was attacking, and then exaggerate the arguments he used so much that he made them ridiculous and so brought contempt on the cause he was pretending to defend.

DEFOE IN THE PILLORY IS UNABASHED, AND SCORES A GREAT TRIUMPH

In this spirit he wrote a pamphlet, *The Shortest Way with Dissenters*, advising that they should be rooted out of the country entirely by the sternest persecution. So exaggerated were his arguments that we cannot understand to-day how anybody could fail to see that they were written to show the folly and failure of persecution. But the obstinate people who believed in persecution were dull-witted, as all such people are, as well as cruel.

They wanted to do what the pamphlet recommended in irony. They thought for the moment that Defoe was a splendid fellow. Then people who were less blind read the pamphlet and saw its real pur-

pose. They told these others how wrongly they had read it, and they were infuriated. So they seized Defoe and put him in the pillory.

"Earless on high, stood unabashed Defoe," wrote a later poet. That is partly untrue, for Defoe's ears were not cropped, as was often the custom when a man was put in the pillory; but certainly he was unabashed. Nothing daunted him. He promptly wrote and sold a Hymn to the Pillory, and the common people so admired his spirit that they gave him a fine reception, and Defoe scored a great personal triumph.

THE IRONICAL STYLE OF ARGUMENT USED BY DANIEL DEFOE

Here is a later example of Defoe's style of argument, showing how he overthrew the cause of his opponents by pretending to agree with them. The Stuarts had now been dethroned; but still some people wished to have them back, and the Pretender, a son of James II, was always hovering about abroad waiting for a chance of landing and claiming the crown. To discredit him in the eyes of the public, Defoe wrote a pamphlet, *What if the Pretender Should Come?* picturing the doings of his Stuart ancestors in the past, while professing to favor them—until the final sentence is reached.

Give us leave, O people of Great Britain, to lay before you a little sketch of your future felicity under the reign of such a glorious prince as we all hope and believe the Pretender to be. First you are to allow that by a just and righteous shutting up of the Exchequer in about seven years' time he may be supposed to have received about forty million sterling from his people to be ready in the Tower or elsewhere upon future emergency, as occasion may allow.

This prodigious wealth will necessarily have these happy effects. First, it will forever deliver this nation from the burden, the expense, the formality and the tyranny of parliament. The country gentlemen will no longer be harassed to come at the command of every court occasion. They will no more be exposed to long and hazardous journeys in the depth of winter from the remotest corners of the island to London. Second, the country will be eased of the intolerable burden of travelling to elections, sometimes in the middle of their harvests. Third, the poor gentlemen will be eased of the expense of elections by which so many have been ruined; and heats and animosities never cease among the people.

Once set the Pretender upon the throne, and let the funds be but happily stopped, and paid into his hands, that he may be in no more need of a parliament, and all these

distempers will be cured as effectually as a fever is cured by cutting off the head, or as a halter cures the bleeding at the nose.

DEFOE'S FICTION SO VIVID THAT IT SEEMS TO BE TRUE

It is not, however, in Defoe's pamphlet-writing, nor in his newspaper work, though he was a great journalistic pioneer, nor in his biographies or travels, though they are interesting and show us what England was like in those days, but in his fiction that Defoe has won for himself a distinct and original place in English literature.

That originality is seen in all his best books—in his *Journal of the Plague Year*, his *Memoirs of a Cavalier*, his *Captain Singleton*, and most strikingly in *Robinson Crusoe*. Defoe believed that people are never so much impressed by reading what they know is fiction made up in a writer's mind as they are impressed by what is true. Defoe's literary secret was to write always as if what he said were true.

That is what Daniel Defoe did perhaps better than any other novelist. So natural is his story-telling that each book of the kind he has written has been seriously believed to be true.

His famous *Journal of the Plague Year* professes to be the experiences of an eye-witness. We walk forth and see for ourselves what is happening, and we talk to the people who are terrified by the plague. But he did not see these things, for he was a child when the plague happened, and he wrote his sham journal after he was a middle-aged man.

ROBINSON CRUSOE, THE IMMORTAL WORK OF CREATIVE GENIUS

By the time *Robinson Crusoe* was written Defoe had had great practice in making the dreams of his own mind seem entirely real happenings, and taking as the groundwork of his book an experience of a shipwrecked sailor, Alexander Selkirk, he wrote a book out of his own head that is more real than almost any other man's account of events he has actually experienced. In doing this Defoe not only told a tale we all like to read again and again, but he proved in the English tongue the superiority of plain, clear, simple writing. But, as in the case of John Bunyan, there was behind this easy writing one of the most imaginative of minds—creative genius.

THE NEXT STORY OF LITERATURE IS ON PAGE 1619.

THE STATUE OF MAISONNEUVE, MONTREAL



Paul de Chomedey, Sieur de Maisonneuve, stands in the same relation to Montreal as Champlain to Quebec. In 1642, with a small company of followers, he made a settlement which he called Ville-Marie de Montreal. There was no thought of profit: it was to be a city of God upon earth. The settlers and their heroic leader faced all difficulties with enthusiasm, but the little settlement was many times threatened with destruction by the Indians as well as by hunger. This spirited statue by the famous Canadian sculptor Louis Philippe Hébert was erected in 1905 in the Place d'Armes. It is a fine reminder of the founding of the city.



Beautiful Hamilton on Lake Ontario.

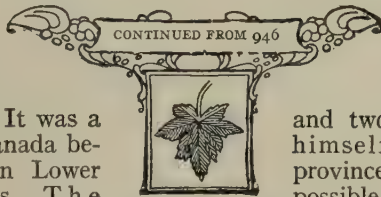
CANADA AS A NATION

THE insurrection in 1837 and 1838 was not a rebellion against the British Government. It was a civil war, in Upper Canada between parties, and in Lower Canada between races. The two movements were perfectly distinct in their origin and in their course, though there was sympathy between them. The rebellion was never serious as regards numbers, influence or possible result. It showed the sincerity of popular loyalty beneath all the foam of foolish public speeches. The loyal reformers were separated from the fiery advocates of independence.

LORD DURHAM, THE PACIFIER, AND HIS WORK

As a result of the rebellion the constitution of Lower Canada was suspended. The French Canadians were silent, while the English reformers were scattered and broken in influence. In Upper Canada the loyalist Tories won at the election. This situation could not last long, but it required a man of great ability to reorganize affairs and settle the troubles. Such a man was found in Lord Durham, who was sent over from England. He came with full power to settle the country, to bring peace and to prevent further trouble, and proved to be the right man in the right place.

He first reorganized temporarily the government of Lower Canada. A gov-



erning council from his own staff was appointed, consisting of five judges and two leading officials. He himself traveled over both provinces, investigating every possible grievance, and called a meeting of the lieutenant-governors and the leading men of the different provinces at Quebec to discuss the question of a union of all the British colonies in North America. The time was not yet ripe for such a project, and Lord Durham in his report merely mentions the idea as a policy which would insure peace and progress, without recommending its adoption at that time.

The governor's great trouble was with the prisoners who crowded the jails of the country and with the rebel leaders, who had escaped and might return at any moment to renew disturbance and promote discontent. A general pardon he did not consider wise, but the less important prisoners were freed upon promise of good behavior. With the ringleaders, who had fled, he could do nothing except to prevent their return, which he did by declaring that if they were found within the borders of the country they would be executed. Of the chief culprits, among whom was Dr. Wolfred Nelson, he banished eight to Bermuda, on pain of execution for high treason if they should return. This last action

was made the occasion for a violent attack by opponents of the home government in England, which weakened and declared that Lord Durham had gone beyond his powers and that the decree should not be allowed. Durham at once resigned, declaring that he had not been supported in his necessary punishment of notorious rebels, and returned home without waiting for a recall or for the acceptance of his resignation in London.

THE DURHAM REPORT AND WHAT CAME OF IT

On his way home Lord Durham, with the assistance of his secretary, Charles Buller, finished a report on the condition of British North America, including Nova Scotia and New Brunswick. In this report Lord Durham set out a long list of the grievances of which the provinces had cause to complain and which ought to be removed. He declared that most of the trouble in Lower Canada came from conflict between the two races, French and English, while in Upper Canada it grew out of politics. To remedy the state of affairs which had led to the rebellions he thought that Upper and Lower Canada should again be united and that they should be given self-government. He said that grants of money should be made only by the legislature, that the towns and townships should be allowed to tax themselves for local needs and improvements, and he proposed that a railway be built to bring Nova Scotia and New Brunswick into closer union with the other provinces. He also advised that improvements be made in the canals.

Early in 1839 the report was laid before the British Parliament, and a bill to unite Upper and Lower Canada was introduced. It was not passed that year, however, because it was necessary to obtain the consent of the provinces. To do this Mr. Poulett Thomson (afterward Lord Sydenham), a shrewd and careful administrator, was sent out as governor. He arrived at Montreal in November and had little trouble in obtaining the consent of the Lower Province, and in December he succeeded in passing a favorable bill through the legislature of Upper Canada. Then Lord John Russell, the Colonial Secretary, again introduced his bill; it passed the British Parliament, and on February 10, 1840, the two provinces were reunited. This union was to last for seventeen years, and then to be finally broken.

UPPER AND LOWER CANADA ARE AGAIN UNITED

Under the act the Province of Canada—for by this name the united provinces were to be known—was provided with a legislative council and an assembly. The legislative council was to consist of not less than twenty members who were to be appointed for life by the governor as representative of the king. The assembly was to consist of eighty-four members, one-half to be elected from each of the two old divisions, Upper and Lower Canada. The number of representatives in the assembly could be changed only by a majority of two-thirds in each branch of the legislature. The assembly was to continue for four years after each election unless sooner dissolved by the governor. Any provincial act might be disallowed by the British Parliament at any time within two years after it was received by the Colonial Secretary in London. All written proceedings of the legislature were to be only in the English language. The capital of Canada was to be fixed from time to time by the governor.

KINGSTON, THE FIRST CAPITAL OF CANADA

The first general election was held in March, 1841, and the first parliament met in June at Kingston, the new capital of Canada. For the legislative council Lord Sydenham chose twenty-four men from different parts of the united province. This new parliament entered upon its work with much energy.

Particular attention was paid to public works. The Welland Canal became the property of the province. Provision was made for the building of new canals on the St. Lawrence River. A municipal act was passed which gave a form of self-government to the towns and townships. Large sums were voted for road improvement, and the old corduroy roads rapidly gave place to gravel roadbeds.

A few days before the session of 1841 closed, Lord Sydenham was thrown from his horse, and died as a result of the accident.

THE FIRST PARTY MINISTRY

His first successor in office was Sir Charles Bagot, who took a very important step for the future of the colony. He appointed all the ministers from the party in power, and in order to do this he admitted French Canadians to the executive

BEAUTIFUL QUEBEC ON THE HEIGHT



Here are two parts of Quebec, one known as the Lower Town and the other as the Upper. Here is a view down Champlain Street in the picturesque Lower Town. The Lower Town was the site of Champlain's fort, from which the city sprang. The heights behind it kept the Lower Town from growing and so the Upper Town was built.



Here we see another view of the contrast between the old and the new. On the height to the left is the great Château Frontenac Hotel with Dufferin Terrace in front. Below is the quaint old Lower Town. Photos, copyrighted by H. C. White Co.

council, or cabinet. It was the first distinctly party ministry in the British colonies, and Bagot was severely criticized by the Colonial Office in England. In consequence he asked to be recalled and his request was granted, but he died at Kingston in March, 1843.

THE FOUNDATION OF THE PUBLIC-SCHOOL SYSTEM IN CANADA

Immediately after the union of the provinces the legislature turned its attention to the important matter of providing schools for the children. In Quebec the church authorities preferred to keep the schools in their own hands, but in Ontario a school was built in every township. Grammar schools were provided in the large centres, and model schools were built so that teachers might be trained. The Government gave some of the money for these purposes; the towns and townships taxed themselves for part, and for the rest the parents had to pay a certain sum for each child. Although as yet parents were not compelled to send their children to school, this was the beginning of the public-school system in Canada. In 1843 Dr. Egerton Ryerson, a Methodist clergyman whose name is held in high honor among Canadians, was made the first General Superintendent of Education for Ontario, and devoted himself to increasing the usefulness of the schools.

RESPONSIBLE GOVERNMENT IS THREATENED, BUT TRIUMPHS

Sir Charles Bagot's successor was Sir Charles Metcalfe, who proved to be the centre of one of the most stormy periods in Canadian history. During the years which had passed since the union of the provinces the country had been working toward responsible government, which means that a party can stay in power only so long as it has the support of a majority of the members of the legislature. Sir Charles Metcalfe, who arrived in 1843, could not understand this system, and from the first he determined to lead his council instead of being guided by it.

He sought counsel openly of men known to be unfriendly to his ministers; he made appointments to office without considering their wishes, and finally made one appointment in direct opposition to their advice. This was too much, and the ministers resigned. The general election which followed gave the governor a small majority, but during the next two years a continuous struggle went on be-

tween the two political parties. In the fall of 1845, however, Metcalfe resigned on account of ill-health and was succeeded by Earl Cathcart, the commander of the army, who held the position until the end of January, 1847, when Lord Elgin was appointed.

Lord Elgin came to Canada as its governor in 1847. He had married a daughter of Lord Durham and was anxious to see his father-in-law's views carried into practice. Like Lord Durham, this great administrator possessed the ability to grasp at once all the threads of a tangled situation. He could see the real love of their country, as well as their love of liberty, which the Liberals had, and he could also see that the love of power shown by the Tories was not mere desire for office and position, but was in great part desire for power to do what they believed to be best for their country.

Lord Elgin was in sympathy with the workings of responsible government. So far as he was concerned, parties, in order to keep in power, had to have the support of the majority of the people. He gave the leaders the fullest freedom of action and aided the successful party in carrying on the government according to the wishes of the majority. The old loyalists claimed this was an abdication of the duties of the governor-general and a sacrifice of one of the remaining shreds of British power over provincial affairs, but to it they had to submit.

RECIPROCITY WITH THE UNITED STATES

Meantime the country was growing slowly. Since the American Revolution Canada had been aided by the laws under which Canadian products paid only a small customs duty in England, instead of the high duty charged on merchandise from the United States and other countries. But in 1846 England began to adopt free trade, and Canada was deprived of her former advantages in the English markets. Commercial depression followed. Property in the towns lost half its value, and large numbers of merchants became bankrupt. A feeling in favor of union with the United States spread among some of the merchants, especially in Montreal.

Elgin himself was astonished that the discontent did not produce an outbreak. There was, as he said, but one way of restoring contentment. That was to gain

MONTREAL, THE ISLAND CITY



Montreal, the city of Champlain, holds the first rank among Canadian cities. Behind it towers Mount Royal, which is the English form of the word Montreal. Few cities are more beautiful. This view, which shows Victoria Bridge in the distance, was taken from the mountain, now made into a fine park.



The broad St. Lawrence connects Montreal with the sea. Here are the busy wharves at which steamers from Europe load and unload. The St. Lawrence is here crossed by the great Victoria Bridge, a marvel of engineering skill. Except in winter, the largest ocean-going steamships can come to the city.

a new market by obtaining favorable trade relations with the United States, and to secure it the governor, in company with delegates, went to Washington and succeeded in securing a reciprocity treaty (1854). Under it the United States and the British provinces were each to admit the products of the farm, the forest and the sea of the other free of duty. A very large increase in trade soon followed between the two countries. The agreement lasted for about ten years, coming to an end by the wish of the United States in 1866, just about the time that the provinces in British North America were preparing to unite.

CONFEDERATION OF THE PROVINCES SUGGESTED

The feeling that the government in Canada was not the best had been growing for some time, and in 1859 the reform party of Upper Canada suggested that instead of the existing legislature there should be a federal union between the two parts of the province. Each part should have its own parliament to regulate its local affairs, while a parliament chosen on a basis of population should legislate on all matters of common concern. The reform party of Lower Canada also adopted these principles, but at first little interest was shown. The movement continued to grow, however, and its strength was increased by the disputes between the United States and England during the American Civil War. The English Government favored the idea, and Lord Monck, who was appointed governor-general in 1861, used all his influence to advance the plan. Lieutenant-governors were appointed with distinct, though private, instructions along the same lines.

THE FATHERS OF CONFEDERATION AND THE QUEBEC CONFERENCE

In October, 1864, a conference of leading men from Canada, Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland met in Quebec. These men, known in history as the "Fathers of Confederation," met with the object of laying the foundations of a new British Empire. This gathering, after a prolonged discussion, finally passed the "Seventy-two Resolutions," which practically constituted the British North America Act of 1867.

There was a long struggle before success came, but the Resolutions were adopted in the Canadian assembly in 1865

by 91 to 33 votes, and in the council by 85 to 45 votes. After two general elections in New Brunswick and a change of government they were approved in July, 1866, by good majorities. In Nova Scotia they were adopted by the legislature without a general election. Prince Edward Island and Newfoundland refused to adopt the terms of confederation.

Late in the same year delegates from Canada, Nova Scotia and New Brunswick went to England and on December 4, 1866, met in London for a final conference before the act of confederation was passed. At this conference a bill was drafted from the Quebec Resolutions. It was presented to the British Parliament, was passed, and on March 29, 1867, received the royal assent, and the British North America Act became law and created the Dominion of Canada. The Act provided that the union should take effect upon a day to be fixed by royal proclamation, and on May 22 the proclamation was issued, naming July 1, 1867, as the birthday of the Dominion of Canada. The United Province of Canada was divided into Quebec and Ontario, and with Nova Scotia and New Brunswick comprised the four original provinces in the Dominion.

THE BRITISH NORTH AMERICA ACT— THE CONSTITUTION OF CANADA

The form of government as constituted by the British North America Act consists of: (1) A Governor-General, appointed for five years, who represents the king. (2) A Cabinet, composed of members of the privy council for the Dominion chosen from either of the Houses of Parliament. The chief is the Premier, who is usually the leader of the House of Commons as well as the recognized leader of his party. The Cabinet must command the support or confidence of a majority in the House of Commons. (3) A Senate, whose members are appointed for life by the governor-general in council (that is, by the Dominion cabinet). It is composed of ninety-six members, who must hold a certain amount of property, be thirty years of age, and British subjects. (4) A House of Commons, composed of members elected for a maximum period of five years by popular vote. There is no property qualification, but members must be British subjects, at least twenty-one years of age, and not disqualified by law. (5) Provincial governments composed of a lieutenant-governor appointed for a term

COUNTRY AND CITY IN THE NORTHWEST



Canadians in the Northwest are fully awake to the necessity for education, and are making provision to give every advantage to their children. Saskatoon, in Saskatchewan, already has a university and an agricultural college, with good primary schools and a high school to prepare the young people for these higher institutions. This picture shows the Collegiate Institute, or High School.



On the plains of the province of Alberta are many cattle ranges like this. In fact, Canada seems to be destined to become one of the great meat-producing countries of the world. The ranges in the United States are being broken up into farms, and Canada, with her millions of acres of fresh land, can support many cattle. Canadians are now, however, more inclined to hold large stock farms than to have ranges.

of five years by the Dominion cabinet; a ministry, composed of the heads of the various departments; and a legislative assembly, elected for four years by the people. In Nova Scotia and Quebec there is also a legislative council, appointed by the provincial ministry.

The first Dominion ministry, with Sir John A. Macdonald as premier, was composed of the men in each province who had fought for confederation. The election took place during the summer of 1867, and this ministry was sustained by large majorities in Ontario, Quebec and New Brunswick. The first Dominion Parliament met at Ottawa on November 7, 1867, and closed in May, 1868.

THE GREAT WESTERN PLAIN BECOMES PART OF THE DOMINION

This first parliament turned its attention to the extension of the Dominion westward toward the Pacific Ocean. Early in December, 1867, resolutions were adopted in favor of the immediate transfer to Canada of Rupert's Land and the Northwest Territory, which up to that time had been under the control of the Hudson's Bay Company. Some of the people insisted that the company should first be bought out and its claims settled, so that nothing might remain which might afterward have to be settled in the courts. The resolutions, however, were agreed to, and an address to the Queen was then adopted, requesting that these territories be joined to the Dominion of Canada by an Imperial order in council. The Imperial Government took the same view of the question as the minority did in Canada. The Hudson's Bay Company must first be bought out. Finally a settlement was made whereby the company was to be paid \$1,500,000 in cash, and was to retain the land around the various trading-posts and two sections in each township—a total reservation of one-twentieth of the region—in return for the surrender of its trade monopoly and all of its claims to government of the great region which stretches from Ontario to the Rocky Mountains and from the southern boundary of the Dominion to the Pole.

THE RIEL REBELLION AT THE RED RIVER

In 1869 an act was passed providing for the appointment of a lieutenant-governor and a small council to administer the affairs of the territory until a more permanent form of government could be

arranged. The Honorable William Macdougall was appointed lieutenant-governor, and early in the fall of 1869 started for the West. But on reaching Pembina he was served by a French half-breed with a notice forbidding his entry into the territory, in which a rebellion had broken out.

There was already a settlement of about 10,000 people on the Red River. They were for the most part descendants of Scotch settlers, French trappers and Indians, and were called half-breeds. These people, who were not consulted about the change in their government, were almost all ignorant and were easily persuaded that they were being robbed of the lands over which they hunted. They determined to rebel against the new authorities, who had made stupid mistakes in dealing with them, and to create a government of their own. A convention was called at Fort Garry, now the city of Winnipeg, and a provisional government was set up with Louis Riel as president. The half-breeds took up arms and there was some fighting, but the outbreak was soon put down, peace was restored, and Riel became a fugitive. He again headed a rebellion in the West in 1885 and was executed.

MANITOBA: THE FIRST OF THE WESTERN PROVINCES

Even before the rebellion was quelled Manitoba was brought into the Confederation. The Imperial order in council which made Rupert's Land and the Northwest Territory part of the Dominion was issued on June 23, 1870, and on the same day the provisional government accepted the law which made Manitoba a province, the first to be carved out of the great West. The new province was composed of the Red River Settlement, another settlement which had been made at Portage la Prairie, and the surrounding regions, and its boundaries have since been much enlarged. Under the Manitoba Act the government was to consist of a lieutenant-governor, a legislative council and a legislature of twenty-four members, but five years later the legislative council was abolished. The legislature now numbers forty-one members.

BRITISH COLUMBIA, THE FAR WESTERN PROVINCE

The next province to be admitted was British Columbia, which lies far off across the Rocky Mountains. British Columbia was a self-governing colony with a gov-

ernor and a legislative council, and had an exciting history of mining camps which sprang up almost in a night and faded away as quickly when the gold fever had passed. The Hudson's Bay Company had been working there for years, and originally there had been two colonies, British Columbia on the mainland and Vancouver Island, but at their own request they had been united.

As soon as the Dominion was formed the colony decided to join the Confederation, and its legislature passed the necessary resolutions. But the governor, who objected to the union, refused to assent to them, and it was not until his resignation and the appointment of a new governor that the people were able to carry out their wishes. In 1870, however, they were able to send delegates to the Dominion parliament at Ottawa; terms were agreed upon and ratified, and on July 20, 1871, British Columbia became the sixth province in the Dominion.

One of the terms of the union with British Columbia was that the Dominion of Canada should commence a railroad to connect the Pacific coast with the older provinces within two years and complete the work within ten. In the spring of 1872 a bill was passed providing for the construction under charter of the Canadian Pacific Railway. A company was duly formed, and to it the contract was let. In the session of 1873 charges of corruption were made against the Government. It was claimed that the company had bought its charter by paying large sums for the election expenses of the supporters of the bill. The charges were denied, but an investigation which followed disclosed such a state of affairs that Sir John A. Macdonald and his ministry resigned. He was succeeded by the Honorable Alexander Mackenzie, leader of the reform party in the House of Commons.

PRINCE EDWARD ISLAND JOINS THE CONFEDERATION

In the meantime Prince Edward Island, which had at first refused to join the Confederation, had built a railroad from one end of the island to the other. A large debt was contracted which the island was unable to pay, and in their difficulty the people turned to the Dominion. In 1873 delegates were sent to Ottawa to arrange terms of confederation. An agreement was reached, and on July 1, 1873, another province was added to the Dominion.

CANADA FOR THE CANADIANS

Alexander Mackenzie was premier for five years, but at the next general election he was defeated on a very unimportant question. Commencing with 1873, American goods in great quantities were imported into Canada. The tariff of 17½ per cent was not sufficient to protect the infant Canadian industries, and the people clamored for more protection, but Mackenzie paid no heed to their demands. Macdonald, quick to seize an opportunity, started the cry of "Canada for the Canadians," and a higher protection to the Canadian producer. This policy was everywhere favorably received, and in the general elections of 1878 Sir John returned to power, and he at once carried into effect his protective policy by an increase in the tariff. Immediately upon his re-election Sir John again turned his attention to the Canadian Pacific Railway, and this great road was finished in 1885.

THE DEVELOPMENT OF THE GREAT WEST

After the building of the railroad the vast regions of the West gradually gained in importance. Assiniboia, Saskatchewan, Alberta and Athabasca were, on May 17, 1882, made into districts and united under a lieutenant-governor, with his capital at Regina, and with institutions which slowly developed, until in 1898 they were self-governing. In 1905 these districts were divided into two equal sections, and under the names of Saskatchewan and Alberta became provinces of the Dominion. Meanwhile, in April, 1876, Keewatin had been made a district under the lieutenant-governor of Manitoba, and on October 2, 1895, the unorganized northern country was formed into districts of Mackenzie, Ungava and Franklin, and was placed under the control of the Regina government. In 1897, after the discovery of gold, the district of Yukon was created. It was at first given to the Regina government, but the following year this region was placed under Dominion management.

In 1912 Ungava became part of Quebec; part of Keewatin went to Ontario and part to Manitoba, and the remainder of that district, with Mackenzie and Franklin, form the Northwest Territories, and are governed by a commission and a council of four members.

The transformation of the face of the land has been made so rapidly that it

seems as if nothing but magic could have brought it about. Where the buffalo roamed in huge herds and the Indians were the only human masters, civilization has laid its hand. The result shows in wide-planted acreage of grain and orchard trees, lively towns with every modern invention put to use, schools and colleges and model farms, miles of roadway where automobiles run ceaselessly, and lines of steel railroads with mammoth engines hauling precious loads of mankind or merchandise.

Upon the outbreak of the World War Canada flung herself into the fray. Before the end of 1914 a Canadian division was across the sea, to be followed by a second, a third, a fourth, and a Canadian cavalry brigade. Replacements kept all of these near full strength. On many battlefields Canadian soldiers showed themselves second to none, and the people at home supported them magnificently.

PREMIERS AND GOVERNORS OF THE DOMINION SINCE CONFEDERATION

Except for the five years during which Alexander Mackenzie was in power, Sir John A. Macdonald remained at the head of the government from confederation until his death, in 1891. Then Sir John Abbott became premier, but in a short time was succeeded by Sir John Thompson. Upon his death, in December, 1894, Sir Mackenzie Bowell took up the reins of government. Early in 1896 Sir Charles Tupper resigned his position as High Commissioner for Canada in England to take the leadership of the Conservative party as premier of the Dominion. In the following June elections the Conservatives were defeated and the Liberal party, under the leadership of Sir Wilfrid Laurier, came into power.

Sir Wilfrid held office until 1911, when his party was defeated on the question of reciprocity with the United States and for other reasons. Robert L. Borden, a member for Halifax, who opposed the Laurier policy, succeeded as premier. For the first year of the World War all party issues were put aside. Liberals granted the Conservative government under Sir Robert Borden unhampered leadership. Sir Wilfrid Laurier himself declared in parliament: "We raise no question, we take no exception, we offer no criticism, and shall offer no criticism, so long as there is danger at the front."

This unity, unhappily, could not weather the storms of war problems and war policies. Final division came over the question of conscription, which was opposed by Laurier and many of the Liberals. Personal affection for the long-admired statesman did not grow less, but, in spite of vigorous efforts, he failed to carry the people with him in the vote. Sir Wilfrid's death came suddenly of apoplexy in 1919. As a mark of respect Parliament adjourned immediately after the opening speech from the Throne had been read.

SIR ROBERT BORDEN HOLDS THE HELM IN WAR YEARS

Through the years of effort and struggle in the war, through the disagreement over conscription and other questions, Sir Robert held his course firmly but without ill-feeling. With his colleagues he went to England to attend Imperial war conferences and Imperial war cabinets. In 1917 the Parliamentary franchise was extended to women. In that year, too, the Government began its first purchase of railway shares, a step that was to culminate two years later in the organization of the Canadian National Railways, which embraced three of the great railway companies.

After-war disorder resulted in a great strike in Winnipeg (from May 1 to June 15, 1919) and other western cities. In the summer of this year H. R. H. the Prince of Wales made an official tour of Canada, formally opening the Quebec Bridge and laying the foundation stone of the tower of the new Parliament Building in Ottawa.

Canada ratified the Treaty of Versailles in February, 1920. In July Borden resigned, and his place was taken by the Right Honorable Arthur Meighen—the youngest prime minister that had ever taken into his hands the reins of government for Canada. He was also the first prime minister to care for the West. This year saw the beginning of legislation by provinces on the prohibition of liquor.

Canada's position as a self-governing dominion, in the post-war conception of the British Empire as a confederation of states, was recognized in her representation at Paris, at Geneva and at Washington in the meetings of the Peace Conference, the League of Nations and the Arms Conference. A Canadian minister to Washington was also decided upon, but no minister to date has been appointed.

After the general election of December, 1921, Mr. Meighen could not command a majority in parliament and was succeeded by William Lyon Mackenzie King, the head of the Liberal party which now returned to power. Canada and the United States held a First International Postal Conference at Ottawa, and Canada for the first time signed separate trade agreements with foreign nations, beginning with France and Italy.

The National Defence Act of 1922 amalgamated the Militia, Naval and Air Force departments. In 1923 a redistribution of seats in the Lower House was made.

THE INFLUENCE OF THE GOVERNOR-GENERAL IN CANADA

There were days when the governor was everything to a North American colony. Governor Simcoe and Sir Isaac Brock were the men who made Ontario, and Lord Elgin meant much to the province of Canada; but since confederation the governor-general has lost much of his power. He is a pacifier, and his work is to bind closer the ties between Canada and the motherland.

The first governor-general was Lord Monck, succeeded in 1868 by Lord Lisgar. Lord Dufferin, Canada's most popular governor, came in 1872. He was one of the greatest diplomats of his day, and by his tact and diplomacy did a great deal to save the unity of the Dominion. His frequent trips from province to province did much to bind them closer together. He laughingly compared the functions of the governor of Canada to those of a man superintending a piece of steam-driven machinery, "who simply walks about with a little tin vessel of oil in his hand and pours a drop of oil here and a drop of oil there, as the occasion or the creaking of a joint may require." The Northwest Territories had just been made a part of the Dominion, so he was the first governor-general to rule over the whole broad territory of British North America from the shores of the Atlantic to the shores of the Pacific Ocean. He was succeeded in 1878 by the Queen's son-in-law, the Marquis of Lorne. In 1883 the Marquis of Lansdowne was appointed, and five years later he was followed by Lord Stanley. The Earl of Aberdeen, who had held many important posts, came in 1893, and in 1898 he was succeeded by the Earl of Minto. Lord Grey came in 1904, the

Duke of Connaught in 1911, the Duke of Devonshire in 1916, and Baron Byng of Vimy in 1921.

Canada is a country of wonderful resources, with an abundance of all kinds of raw materials. Her forest lands cover an area of more than a million square miles, and she has millions of acres of rich wheat lands awaiting the plow. The richest silver and nickel mines in the world are found within her boundaries. In mineral wealth generally she ranks with any other country, and her manufactures are rapidly being developed. In 1923 the population was 9,116,457.

Canada is rapidly becoming a great nation. Population has grown more slowly than in the great nation to the south of her, partly because of stricter immigration laws. Her people have made for her so honorable a name that men and women eager to call themselves Canadians will come to fill up the great northwestern plains.

While men were so busy with building homes and opening up the new land they could not take much time to dream or give expression to their imaginings in literature or art. But the feeling for beauty and for its expression will not long be held down, and Canada has made a good start in the writing of books, the painting of pictures and in the modeling of fine pieces of sculpture.

Canadian scholars are heard with respect whenever learned men gather together. Canadian authors find readers everywhere. Every year more books by authors of Canadian birth or adoption are published, and a national literature is developing. Art and architecture are not neglected, and some of the men who have gained wealth are bringing masterpieces of European art across the ocean.

We have followed here some of the steps by which Canada has gone forward until she has taken her proud place, no longer as a colony, but as a strong daughter nation of the British Empire, ready to stand shoulder to shoulder with the mother country in any danger—brave, loyal, devoted. This has been well proven in two wars. In the South African War of 1900 her troops did their full share of hard fighting, and we all know the high record of Canada's devotion in the World War during the years 1914 to 1918.

THE NEXT STORY OF CANADA IS ON PAGE 1833.

PICTURES BY THE SPANISH ARTISTS



St. Basil, painted
by El Greco.



The Infante Philipp Prosper,
by Velasquez.



The Adoration of the Shepherds,
by José Ribera.



The Infant Jesus and the Infant St. John, by Murillo, in the Prado, Madrid.



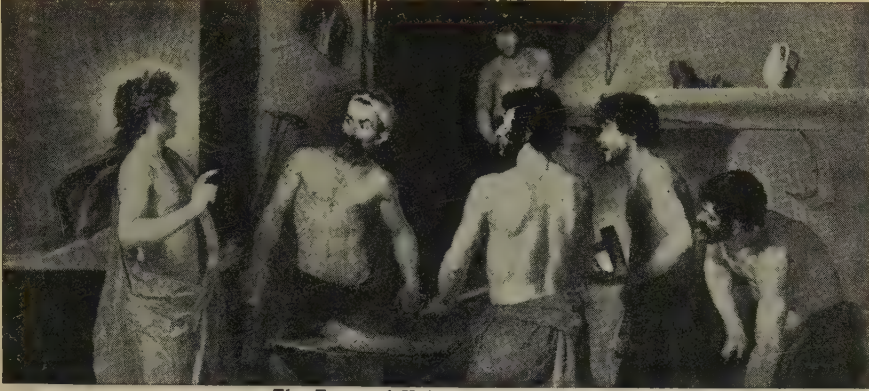
The Miracle of St. Hugo,
by Francisco Zurbarán.



The Infant St. John,
by Murillo.



St. Bruno and Pope Urban II,
by Francisco Zurbarán.



The Forge of Vulcan, by Velasquez.

THE SPANIARDS AND THEIR PICTURES

WHEN Ferdinand and Isabella drove the Moors out of Spain they set back by centuries the civilization of the country. Instead of planting in the rich soil of Moorish culture they allowed the land to become desert. The wider the possessions of Spain grew, the more her soul was shrunken. She was too busy wielding the sword to learn the delicate art of holding the brush. The beautiful warmth of the Gothic movement passed her by, and it was not till the sixteenth century that she was stirred to real activity in the direction of art.

Her early painters were cold, monkish men. There was Morales (1509-86), who never seemed to tire of painting his sad-faced Madonnas and Saints. After him came Domenico Theotocopuli, a Cretan, known as El Greco. He lived from about 1545 to 1614, and worked chiefly at Toledo in Spain.

El Greco seemed sorry to be alive at all, and tried to explain all about it in his pictures. They are queer, distorted religious subjects, not pleasantly out of drawing like the saints of the Sienese school, which appear to have been painted by happy children dreaming of the heavenly land; rather are they the work of a man whom some inward sorrow kept from



seeing the lovely and the fair either in men and women or angels. But El

Greco is one of those artists of whom people will think more and more, because of what he was trying to express.

He was a pupil of Titian at Venice, then went from Venice to Rome. Probably about 1577 he arrived in Spain, going to Toledo to paint. Instead of following Titian's gracious light and coloring he used a pale, strange coldness of color. His lights and shades became harsh and exaggerated, like those of the realists in the decadent years of Italian art. It was as if he dared not do otherwise and had a horror of drawing faces that smiled naturally.

His last work is extraordinarily distorted and queer. That he was capable of composition, movement and energy is quite plain from his picture of Christ driving out the traders from the Temple, in the National Gallery, London. Some of his portraits have a fine dignity. His masterpiece is the Burial of the Conde de Orgaz, at Toledo. It is now thought almost as fine as the work of Velasquez.

El Greco was a voice crying in the wilderness, preparing for the beauty to come; a figure in the shadows, peering for the dawn that was presently to make a sudden glory in Spain.

In the meantime, Ribera, who had studied with the realist Caravaggio in Italy, was painting striking pictures—pictures where color had become a bleached and angry light, and shadows looked as if they had been dug with a spade out of a black pit; where men's muscles seemed ready to crack, and where there was scarcely a face that was not expressive of violent emotion or pleted with the lines of age. From El Greco's sacred gloom we thus step into the fierce and artificial light of Ribera's harsh realism.

WHAT IS MISSING IN THE GREAT SPANISH PICTURES

Ribera, who lived from 1588 to 1656, was a mixture of Spanish and Italian realism; he had a considerable effect on the Seville school of painting and also on the men who came after. Italian realism, we know, started with Caravaggio, the Neapolitan artist. We remember how angry this man had been with painters who were content with imitating others, and how he went to a sorry extreme of brutality in trying to show that it is better at all costs to give expression to oneself. Ribera, who had sat at the feet of Caravaggio a long time, carried on his work, and for about two hundred years the spirit of his pictures acted and reacted on European art.

There was something in the Spanish country and character that made an excellent soil for Ribera to work in. The Spaniards, as a race, were unimaginative and a little cruel. These qualities showed themselves in the times of the Inquisition, and persist even to this day in the national sport of bull-fighting.

The pictures of these old Spanish painters have nothing of the spiritual beauty of imagination. You are never allowed to guess, in looking at their work, that something is hiding behind the picture; you never feel the soft rain, and the scent of the roses in the background; you do not guess that the woman painted has just stopped saying something you want to hear and presently will go on with her song and her sorrow.

THE GREAT MISTAKE THE REALIST ARTISTS MAKE

Remember that in the country surrounding the people of Spain there is no touch of illusion. Their eyes are trained to harsh lights and shadows. The sun takes away from their land-

scapes the dewy greens and gentle tones native to more northern countries.

Ribera made the great mistake of realists in thinking that in order to paint what he saw he must needs paint unpleasant things. It was necessary for a greater than he to show the beauty of actual objects. But Ribera unconsciously prepared the way for the genius of Spain. He had turned people's eyes from the strange, distorted religious paintings of El Greco, and at times in his own work there is a hint of nobility.

Of the many artists who followed in Ribera's path the most memorable was Zurbaran. He lived from 1598 to 1662, and was a painter who devoted himself to studies of monks and saints. A famous picture of his is the kneeling Dominican, in the National Gallery, London. The man is praying with great fervor; and as one looks at the picture it seems that the inward radiance of the soul is stronger than the actual light falling across the hood on to the uplifted face.

Another of Zurbaran's pictures showing his straining after effect and his violent realistic treatment is the group of St. Bonaventura and St. Thomas Aquinas, in Berlin. The painting of St. Bruno and the Pope, in Seville, is a curious and interesting study of still, monkish men, their garments seeming to be the heavy casings of lifeless bodies; the faces, stamped by thought and suffering and ambition, make the only spots of life in the picture.

THE GREATEST GENIUS OF TECHNIQUE THE WORLD HAS KNOWN

Don Diego de Silva y Velasquez, the great genius of Spain, emerged into the tumult and activities of the realists like a great ship gliding over waves which unsteadied smaller craft. He lived from 1599 to 1660 and appeared from the beginning to be set apart for high deeds. Like Queen Elizabeth, he "could always count much on fortune." Poverty and disgrace, disappointment and loneliness never cross-starred his path. He was healthy and happy and sane; and he shook from him, as a dog would shake water from his coat, the influences which were weighing heavily on the Spanish artists of his day. He believed in what he saw, being a true son of Spain; but he had "a new kind of artist's eyesight, a new conception of realism," and what he saw was beauty incarnate.

In any art gallery where Velasquez's

THREE FAMOUS PICTURES FROM SPAIN



Photo, courtesy Metropolitan Museum of Art.

Christ and the Pilgrims of Emmaus, by Velasquez, in the Metropolitan Museum of Art, New York.



The Madonna and Child, by Murillo, in the Pitti Gallery, Florence.



The Madonna and Angels, by Murillo, in the Louvre, Paris.

paintings are hung we may see artists peering and studying, sketching and copying, trying to read the secret of his unapproachable greatness. He is the mightiest genius of technique the world has ever known. His strength lay not in form or in color, but in revelation of light. He did not gloat over the human body as Michelangelo did, but when he had to paint it he painted it flawlessly.

He was not seized with the passion for brilliant hues that marked the Venetian painters, partly because color as color does not exist in Spain as it does in Venice, and partly because he was sensitive to something greater—light. Velasquez, like other Spaniards, loved neutral tints; he was a master of grays. But El Greco's and Ribera's grays are cold and stone-like; Velasquez's grays are silver and pearl, shining like the gray dew of dawn.

PORTRAITS THAT BRING SEVENTEENTH-CENTURY SPAIN TO LIFE AGAIN

It is probable that artists of many more generations will still strive to find how Velasquez got such radiance into his grays. Light seemed to hide in his palette and cling to his brush. He did not do much preliminary drawing, but painted at once upon the canvas. Of his many imitators no one has come within speaking distance of his style; the secret of his genius has not been found out.

Velasquez became artist to Philip IV of Spain. For forty years he was attached to the court, and during the latter part of this period became a kind of confidential secretary—"gentleman of the household." After the heavy routine of court life had swallowed his nights and days for some seven years he yielded to the persuasion of Rubens, who was then in Madrid, to escape for a holiday to Italy.

Velasquez managed to have two summers there before he returned to his post. Twelve years later he visited Rome and Venice again. Except for these lulls his working life was given up to the Spanish monarch, to painting the series of portraits which have brought seventeenth-century Spain to life before our eyes to-day.

DIFFERENT WAYS OF PRESENTING THE CRUCIFIXION

There were intervals when he painted pictures of another kind, classical subjects, and religious subjects, like his Christ on the Cross, and the Madonna, in Ma-

drid, and St. Bridget, in the National Gallery, London.

The Crucifixion, as painted by Velasquez, presents a noble and dignified study—a study that makes one think profoundly without being tortured by the terrors which some painters worked into their pictures. Whenever, in pictures of the Crucifixion, we see that the painter has shown only the horror of physical pain and overlooked the agony of the soul, we know that that picture is poor art—bad taste—appealing to the senses and not the mind, in a study of the most unearthly sorrow that ever befell a human spirit.

It was for the great good fortune of people who live in a world unlikely to produce another man like Velasquez that the great Spaniard escaped two or three times to Italy. In those years he breathed a different air from the stifling atmosphere of the court, and he developed another activity. Without having had those visits he would not likely have painted in his later years (when men are generally content to repeat their successes and imitate their own inspirations) two such masterpieces as *The Tapestry Weavers* and *The Maids of Honor*. These two pictures alone would have set Velasquez on the heights of genius.

THE MAN WHO MIGHT HAVE BEEN THE GREATEST LANDSCAPE-PAINTER

The Tapestry Weavers is a giant composition, a superb study of peasant women at work; its final greatness is in the amazing treatment of light. The light not only falls in a clean shaft behind the central archway, it plays hide-and-seek with the solid forms and properties of the workers in a way that no one save Velasquez has ever seen and painted.

The Maids of Honor is another triumph of the lighted interior. Radiance creeps softly into the room, resting on the little pathetic princess with her waiting-women, and presently touches the older figures in the background, silhouettes the man in the open doorway beyond, and catches the face and brush of the painter himself. This picture illustrates remarkably the "perspective of light," a new phase of perspective whose use was perfected by Velasquez. He shows not only direct light but reflected light, passed from one surface to another, and light in the veils of atmosphere, for he knew that "light is elastic and illuminates the air."

TWO PICTURES OF SPAIN BY GOYA



The Parasol, a cartoon for tapestry, by Goya, in the Prado, Madrid.



Photo, courtesy Metropolitan Museum of Art.

Bull Fight, a painting by Goya, in the Metropolitan Museum of Art, New York.

Velasquez's greatest work of a decorative nature is *The Surrender of Breda*; and there it seems that though he found an intense interest in painting the cavaliers, his happiest moments were when he worked at the landscape in the background and bathed it in a lovely glow. This picture alone makes one guess that had Velasquez lived in another age and in another country he would have been the greatest landscape-painter the world has known.

His portrait work centres round the royal and aristocratic personages of Philip's court. There Velasquez is himself a prince among princes. All the hauteur and coldness of the Spanish king is painted by a man who knew that pride and personal dignity are true qualities of kingship.

COURT FOLK WHO STILL LIVE AS VELASQUEZ PAINTED THEM

The pictures of the young Don Carlos and of Maria Anna of Austria, in Madrid, show like characteristics. Poor great lady! She is condemned to live forever in the world's eyes a fantastic, pathetic figure, burdened by an outrageous headdress, and clothed in so heavy a garment of silk and brocade and velvet that one wonders how she managed to move about. Velasquez's incomparable touch rests on the soft and shining texture of her gown; its tissues seem still brilliant and alive; in contrast, the face above the gown is cold and unhappy.

Excellent paintings by Velasquez in America are to be found in Boston and Philadelphia, as well as in the Metropolitan Museum and the Hispanic Society's collection in New York.

After Velasquez's day the ranks of little men closed in again on the art of Spain. There were one or two portrait-painters, like Carreño de Miranda, a court artist, and then, except for one man, no one of importance until Goya came. The one man was Murillo. He lived from 1617 to 1682, most of the time at Seville, where there are many of his paintings. If you look first at a picture of Velasquez's and then at one of Murillo's, it will seem that Velasquez was a cold aristocrat, caring far less about the people he painted than did Murillo. A kinder, milder spirit than that of the earlier days had brought a happier mood into the life of Spain, and Murillo reflects this change.

HOW MURILLO BRINGS ART TO THE LEVEL OF EVERYDAY LIFE

Murillo was not a genius like Velasquez, but he had a warmer heart. He is an artist we speak of affectionately. The people of his own day loved his pictures, too, for they could easily understand them. His gentle-looking saints and tender, happy children were the very sort of persons that were all around them.

In contrast with the figures of El Greco and Ribera and Zurbaran, his pictured children and Madonnas are natural and lovable. We can note this feeling in the well-known *Immaculate Conception*, in Madrid, and in many of the other religious pictures which came from Murillo's brush. Look at *The Children of the Shell*, the little Jesus with St. John, shown on page 1494. The symbols of the staff and the lamb show that these are the holy children revered by the Christian Church, and their attitudes are somewhat idealized. But the boys themselves are just beautiful, warm-skinned, graceful little lads of Spain.

Not all Murillo's pictures had religious subjects; some were *genre* groups—of beggar-boys or peasants. From his early style of rather cold, hard painting he passed through a middle period of warmer coloring and stronger contrasts, to the misty, vaporous light effect that floats about the figures in his later work.

GAY CANVASES THAT GLOW WITH PICTURES OF SPANISH FOLK

Goya (1746–1828) was a kind of miracle that descended on Spain at a time when hardly anyone knew how to paint, a century after Murillo had produced his pleasant pictures. Distinctly Spanish, loving the gay life of the people and thoroughly acquainted with the ways of the bull-ring, Goya left a great number of pictures which mirror the society of Spain during his lifetime. The men and women he represents in portraits or in picture-telling groups are strong and active and living.

In making studies for tapestries he was unequalled, and his drawings and etchings are even better known than his paintings. His draftsmanship was superb and masterly. Both Velasquez and Goya tremendously influenced the art of Europe. Of the artists of Spain since Goya's time we shall get a glimpse later.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 1585.

SOME PORTRAITS BY VELASQUEZ



PHILIP IV OF SPAIN IN HUNTING COSTUME, IN THE PRADO GALLERY, MADRID



MENIPPUS. IN THE PRADO GALLERY, MADRID



ALESSANDRO DEL BORRO. IN THE BERLIN MUSEUM



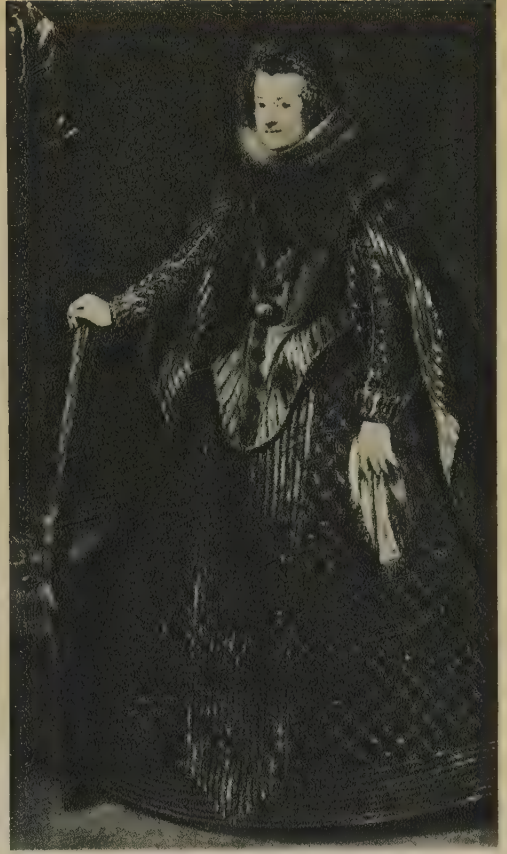
PRINCE BALTHASAR CARLOS. IN THE PRADO GALLERY, MADRID



THE DUKE OF OLIVARES. IN THE PRADO GALLERY, MADRID



KING PHILIP IV, IN A PRIVATE COLLECTION



QUEEN MARY OF HUNGARY, BERLIN MUSEUM



PRINCE BALTHASAR CARLOS, SON OF PHILIP IV,
IN THE PRADO, MADRID



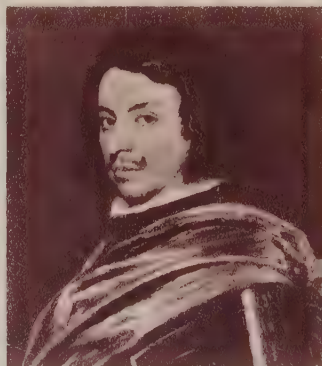
PRINCESS MARGARET, DAUGHTER OF PHILIP IV,
IN THE VIENNA GALLERY



PORTRAIT OF A LADY, IN THE BERLIN MUSEUM



POPE INNOCENT X, IN THE
DORIA GALLERY, ROME



FRANCESCO D'ESTE, IN THE
MODENA GALLERY



QUEEN MARIANA OF AUSTRIA,
VIENNA GALLERY



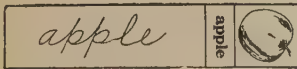
MORE WORTHWHILE GAMES

CONTINUED FROM 1294

READING, WRITING AND NUMBERING
FOR A FRUIT AND VEGETABLE STAND



YOU remember the word cards that helped you learn the names of the colors. You can learn the names of fruits the same way, and then you can play fruit stand. You remember those cards were four inches one way and seven inches the other.



On page 10 of your Work Book is all you need to make the card for apple. There is a picture, the printed word and the written word. You remember you put the picture in the middle of the card on one side and you put the words on the other side. The printed word goes high up so as to leave plenty of room for the written word.



says apple



says peach



says banana



says pear

Now here is a puzzle for you. One of these pictures says "big" and the other one says "little." Which one says "big"?



says big



says little

Yes, the first one says "big," because the fruits that show best

Copyright, 1925, by Ethel B. Waring.

1505

are the big ones. And the other picture says "little," because in it the little fruits are plain.



says cent

Most fruits cost more than 1 cent. Often an apple costs 4 cents or 5 cents. "Cents" means more than 1 cent.



says cents

Now you can make word cards for apple, banana, peach, pear, for big and little, and for cent and cents. You will find the pictures and words for them on pages 10, 11 and 12 of your Work Book. With these word cards to help you, you will surely be able to play fruit stand.

When you want to make a sign to tell how much an apple costs, you can find the card that says "apple" because you put the picture of the apple on it. Trace the word several times. Then turn the card over and on your paper write the word. If you forget, stop and start again. Trace it and write it. When you can write it clear through without looking, write it on your sign.

Here are some good signs for a fruit stand. I know you can read every one by looking up your word cards, just as father looks up his words in the dictionary.

red apple 4 cents		big banana 5 cents
green apple 3 cents	big peach 4 cents	little banana 2 cents
big apple 5 cents	little peach 1 cent	green pear 4 cents
little apple 2 cents	yellow banana 4 cents	brown pear 3 cents
yellow peach 5 cents	red banana 3 cents	big pear 5 cents
green peach 3 cents		little pear 3 cents

If you want to make a fruit stand and haven't enough real fruit to sell your playmates, make as many as you like out of clay. Make them

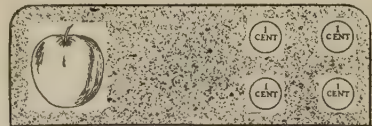
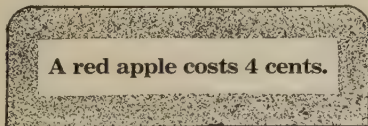
as nearly like the real fruit as you can, some big and some little. If you can't find some real fruits to look at as you work, get some good pictures.

When your clay has hardened and dried, you can paint it with your water-color or show-card paints.

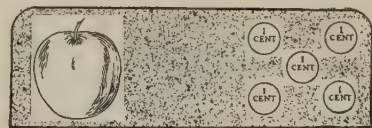
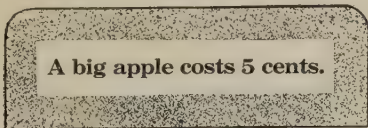
Of course the boys and girls who can read the labels best, and who can make their own labels for the fruit, are the best storekeepers. Here is a game that will help you to be a better storekeeper.

CUT four cards six inches long and two inches wide. Cut four more the same size. Four more and four more. On each of these paste a sentence like these. A red apple costs 4 cents. A green apple costs 3 cents. You will find these sentences on pages 13 and 14 of your Work Book. All of them tell how much something costs, so you will know that word "costs." You can look at your word cards to find out the words for the colors and the fruits if you forget them.

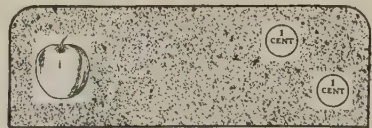
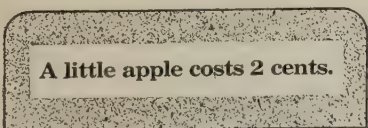
If you want to play the game very fast, you won't want to stop every time you take up a card to look for the word cards. So you can draw the pictures on the back like this. Draw this apple red, for that is what the sentence says.



In this one don't color the apple at all, but make it just as big as you possibly can.



In this one don't color the apple either, but make it very, very small so it will say "little."



Be sure you look at your word cards as you draw these, for you want to draw what the words say.

You can put these cards into your big wheel. When you play, you can get them out by reading them Just Right. If several of you can play together, each of you in turn spin the wheel and try to read the card that stops in front of you. If you do read it, keep it until the end of the game. When the wheel is empty, the one with the most cards wins the game.

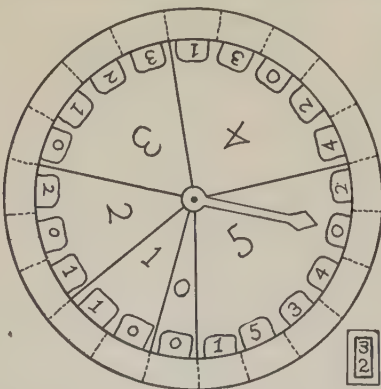
HOW many fruits can you buy for a nickel? A nickel is 5 cents. Make yourself some play pennies with the pictures on page 12 of your Work Book. With a nickel or 5 cents you can buy a little pear for 3 cents and a little banana for 2 cents. Or you can buy a red apple for 4 cents and a little peach for 1 cent. But if you buy a big apple for 5 cents, you can buy nothing more with your nickel.

You see your 3 and 2 make 5, and so do your 4 and 1, and so do your 5 and 0. We call these the 5 combinations, because they all make 5. This is another way to write them.

2	3	4	1	5	0
$\frac{3}{5}$	$\frac{2}{5}$	$\frac{1}{5}$	$\frac{4}{5}$	$\frac{0}{5}$	$\frac{5}{5}$

All of these are different ways to make 5.

Here is a game in which you can learn to know these very fast. Just as quickly as you can see $\frac{2}{3}$ or 2 and 3, you will think 5. This game is called the pocket game, because the combination cards belong in pockets and you try to get them out by saying the number they make.



All the cards that make 5 are in the pockets marked 5. All the cards that make 4 are in the pockets marked 4.

The cards are an inch and a quarter wide and two inches and a half tall. This is an inch and a quarter: $\frac{1}{4}$ inch. This is two inches and a half: $2\frac{1}{2}$ inches.



These cards need to be very very stiff.

If you can get some iron tag board at the paper house, it is very good. You do not want your cards to bend when you put them in the pockets.

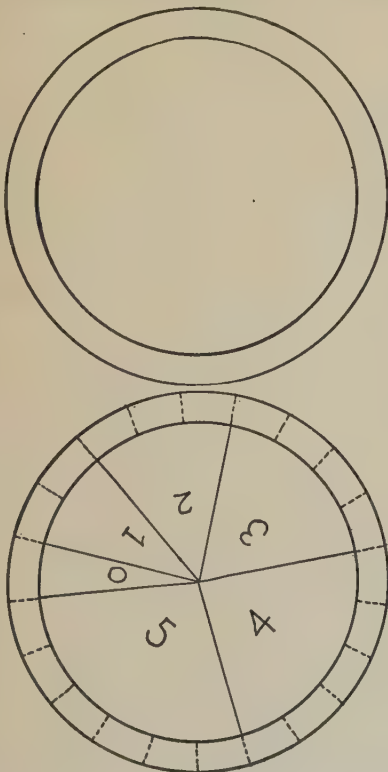
On each card mount one of the combinations you find on page 15

5	5	4	3	2	1	0	5	4
	0	1	2	3	4	5		1

of your Work Book. Put a mark on every card half an inch from the top, and mount the top of your paper at this mark.

If you are making the combinations for 5, write the digit 5 on the back of each card as you make it. Fix the other combinations with their digits on the back too. Keep the big digits from your Work Book to put on the circle. Make a pocket to keep the cards in. If you look at the picture on page 1018 you will remember how to make a pocket.

You remember how to make a big circle by using a string. Cut out the circle on page 140 of your Work Book to help you put the marks



on your circle. Lay it in the centre of your circle and put a mark where each of its lines ends. Then put it away. Draw lines from the centre of your circle to the marks and on out to the edge of the circle. Cut another circle as big as the big circle on which you have drawn the lines. Draw another circle inside it so it will leave a ring one and a half inches wide. This is one and a half inches:



Make a little hole to start your scissors, and cut this circle carefully so as to leave a ring as in the picture.

Now you need help from mother. Ask her to please sew the ring on to the circle around the very outside edge. She can

sew the pockets top, or you can make these just by using paper fasteners. Make as many pockets in each space as there are in the picture. On the back of this pocket game mother can fasten the big pocket you made to hold your game cards.

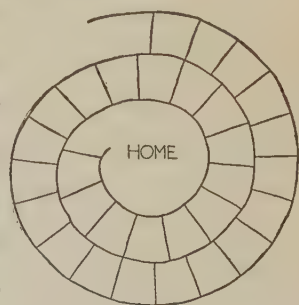
Put the cards in the pockets where they belong. You can tell which pockets they belong in because you wrote the digit on the back of each. Fasten a spinner in the centre of your game with a paper fastener. You can make it of cardboard, or father can make it of tin and put a washer on the top and bottom of the circle and then the spinner will spin very fast.

Spin the spinner a good spin. If it stops at 4, see how many of the combinations you can get out of the 4 pockets. This is the way you get them out. Look at the first card. Only the top number shows. The rest of the card is hidden in the pocket. You say the number you think is hidden in the pocket to help it make 4. Pull the card up and see if you said the right number. If you are right, take the card out. Try all the cards in the 4 pockets. Put down your score. Your score is the number of cards you got out of the pockets.

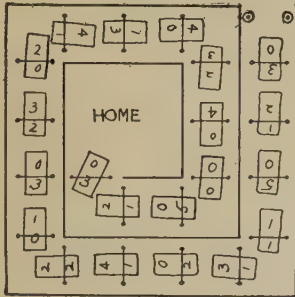
If you are playing alone, keep spinning and trying until you get every one out of the pockets. If you are playing with someone else, of course you take turns and keep score each turn for the number you can get out of the pockets.

Are you remembering to put a ring around your best score? That is the way to tell how much better you are doing each day.

HAVE you ever played hopscotch? You remember you played a hopping game before. Look back to page 347. You remember you hopped five times each turn. In hopscotch you hop just as far as you can without stepping on a line in your path. You draw the path. You draw it in a square field, or in a round field as shown on this page. Draw it right on the ground with a stick, if you have some bare ground to hop on. If you haven't, draw it with



chalk on the sidewalk. You carry a stone or a stick or some other kind of marker with you when you hop, and put it down in the place you have to stop. Then your next turn you pick up your marker and start on from there. You try to get to the centre, called HOME, before anybody else does. Then you win.

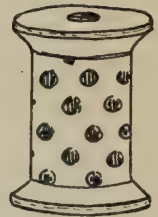


YOU can make a smaller hopscotch field out of cardboard, window curtain, linoleum or heavy paper, and play it with your combination cards. Instead of hopping with your feet, you use a marker. The markers in the picture are made from spools. You can make a different marker for each child who plays the game.

Each of you take a marker and hop him as far as you can from one card to the next, as long as you say the right number without looking on the back. If any of you are not sure, you can always tell what is right by looking on the back where you wrote the right answer. Then you will know it the next time.

To keep your cards in place so the wind won't blow them, or so you won't rub them out of place, you can sew elastic back and forth across the path. Mother will help you get started, and perhaps she will have to do it all for you.

The rules of this game are just like those of the other hopscotch game, and the winner is the first one to get HOME. In which kind of hopscotch do you get the better scores?



Paint stripes, dots or other designs on spools to use for markers.

WHAT HAVE YOU LEARNED?

Do you know the names of the colors?

Do you know the color words?

Do you know the fruit words?

Do you play the games Just Right? That means:

Do you take turns nicely?

Do you do what the rules of the game say?

Do you do as the leader says?

Do you help the other children do Just Right?

Do you make a good leader when it is your turn?

Can you make up new ways to play the games?

Can you score Just Right in any of the games? Look in your score book and see.

Can you score Just Right in all of them?

In the color games?

In the word games?

In the reading games?

In the store games?

In the hopscotch games?

In the combination games with pockets?

In the combination games with hopscotch?

In how many of these games have you a Just Right score in your score book?

If you haven't any Just Right score yet, what is the very best score you have made?

Can you find out how many things you can buy at your store for five cents? Can you give the storeman just enough money for the fruits you buy?

Can you write your own store signs?

Can you help mother more in making the games than you could at first?

Can you help other children play your games with you?



The Book of POETRY

THE SUBJECTS OF POETRY

HAVING gained a general idea of the uses of poetry and of how we can best proceed with the very pleasant task of storing our minds with good poetry, we have to turn next to a new series of studies, in noticing the different purposes of poetry and the subjects with which it deals. There are a great many of these, but as we shall take up only one at a time, they will be easy to learn, and when we have gone through this series, we shall find ourselves prepared to understand more clearly the poetry of each great poet, as, later on, we shall come to study that also.

THE POETRY OF NATURE

EVERY country has a different kind of poetry. That is quite natural. Just as the peoples differ, so will their thoughts and feelings differ. We cannot attempt here to show those differences between the poetry of one country and another; it is enough to say that the poetry of France, of Italy or of Scandinavia is quite another thing from that of America. English poetry, too, is somewhat different from Irish or Scottish, though many Scottish and Irish poets have written poems which are purely English in spirit and form.

The first thing we notice in reading English poetry is what is called the "feeling for nature." This simply means that the writers all seem to be in love with the natural objects and the rural life of their own land. They rejoice to sing of spring mornings, of summer days and sunsets, of lakes and rivers, mountains and glens, of larks and nightingales, and of the sea that breaks along her many coasts.

This love of nature does not appear so much in the poetry of any other country as in that of England.

Even the great dramatic poets, like Shakespeare and Christopher Marlowe, had this love for the natural delights of the country. But long before Shakespeare and Marlowe, long before Chaucer even—and he loved the lovely scenes of nature, and sang of them sweetly—this "note," as it is called, had been given to all her poetry.

The very oldest English song was about the coming of summer. It was written a thousand years ago, and its words are so simple, that, although

CONTINUED FROM 1386

our language has greatly changed since then, it is not very difficult to read

it even now. We shall print it in modern English, however, as it was changed by a poet who lived two hundred years ago:

Summer is a-coming in,
Loud sing, cuckoo;
Groweth seed, and bloweth mead,
And springeth the wood now,
Sing, cuckoo, cuckoo.

Ewe bleateth after lamb
Loweth calf after cow,
Bullock starteth, buck departeth,
Merry sing, cuckoo,
Cuckoo, cuckoo,
Well singeth the cuckoo,
Nor cease to sing now;
Sing cuckoo, now,
Sing cuckoo.

And in all these years all the poets have been singing out of the fullness of their hearts of the changing seasons and the green and golden beauties of the land, so that a vast amount of the poetry of nature is to be found in the works of our poets.

Tennyson gives us many pictures of nature that are perfectly beautiful, as, for instance, *The Brook* (see page 101); while Wordsworth, in such a poem as *The Daffodils* (see page 102), and Shelley, Cowper, Burns, Thomson, and many more, are so filled with this great love of nature that we might almost think in reading them that we were listening to the very voice of nature herself.

That is really what great poetry ought to be—the voice of nature in her different moods of calm and storm, and alternate seasons of work and rest.

EACH IN HIS OWN TONGUE

This poem is an instance of a single poem making an author known wherever English is spoken. The writer is Professor William Herbert Carruth, of Kansas University. The idea is that the indwelling power of God shows itself in many forms, named by many names, such as progress, aspiration, love of beauty, and devotion to duty. All the impulses which tend toward a better state, or call us to an imagined perfection, or open our eyes and hearts to what is lovely, or brace us for unselfish service, are divine, though they may be called by lowlier names.

A FIRE-MIST and a planet,—
A crystal and a cell,—
A jelly-fish and a saurian,
And a cave where the cave-men dwell;
Then a sense of law and beauty,
And a face turned from the clod,—
Some call it Evolution,
And others call it God.

A haze on the far horizon,
The infinite, tender sky,
The ripe, rich tint of the cornfields,
And the wild geese sailing high,—
And all over upland and lowland
The charm of the golden-rod,—
Some of us call it Autumn,
And others call it God.

Like tides on the crescent sea-beach,
When the moon is new and thin,
Into our hearts high yearnings
Come welling and surging in,—
Come from the mystic ocean,
Whose rim no foot has trod,—
Some of us call it Longing,
And others call it God.

A picket frozen on duty,—
A mother starved for her brood,—
Socrates drinking the hemlock,
And Jesus on the rood,
And millions who, humble and nameless,
The straight, hard pathway plod,—
Some call it Consecration,
And others call it God.

ANN RUTLEDGE

Ann Rutledge, a charming girl living in New Salem, Illinois, was engaged to Abraham Lincoln when she died in 1835, and her death saddened his life. This sonnet by Edgar Lee Masters is cut on her gravestone at Petersburg, Illinois. There is a picture of the grave on page 1049.

OUT of me unworthy and unknown
The vibrations of deathless music!
"With malice toward none, with charity for all,"
Out of me forgiveness of millions toward millions,
And the beneficent face of a nation
Shining with justice and truth.
I am Ann Rutledge who sleep beneath these weeds,
Beloved of Abraham Lincoln,
Wedded to him, not through union,
But through separation.
Bloom forever, O Republic,
From the dust of my bosom!

LORD OF ALL BEING*

This splendid hymn is the noble close to Oliver Wendell Holmes's popular book *The Professor at the Breakfast Table*. Dr. Holmes introduces it as a hymn "to the Source of the light we all need to lead us, and the warmth which alone can make us all brothers."

LORD of all being! throned afar,
Thy glory flames from sun and star;
Centre and soul of every sphere,
Yet to each loving heart how near!

Sun of our life, Thy quickening ray
Sheds on our path the glow of day;
Star of our hope, Thy softened light
Cheers the long watches of the night.
Our midnight is Thy smile withdrawn;
Our noontide is Thy gracious dawn;
Our rainbow arch Thy mercy's sign;
All, save the clouds of sin, are Thine.

Lord of all life, below, above,
Whose light is truth, whose warmth is love,
Before Thy ever-blazing throne
We ask no lustre of our own.

Grant us Thy truth to make us free,
And kindling hearts that burn for Thee,
Till all Thy living altars claim
One holy light, one heavenly flame!

I AM †

Ella Wheeler Wilcox took delight in singing of the joy of life. Here, in these flowing verses, she voices what should be the mind of the sane, strong man who realizes that he lives in the world to help, and sets himself to his task with delight and determination.

I KNOW not whence I came,
I know not whither I go;
But the fact stands clear that I am here
In this world of pleasure and woe.
And out of the mist and murk
Another truth stands plain:
It is my power, each day and hour,
To add to its joy or pain.

I know that the earth exists,
It is none of my business why;
I cannot find out what it's all about,
I would but waste time to try.
My life is a brief, brief thing,
I am here for a little space;
And while I stay I would like, if I may,
To brighten and better the place.

The trouble, I think, with us all
Is the lack of a high conceit.
If each man thought he was sent to this spot
To make it a bit more sweet,
How soon we could gladden the world,
How easily right all wrong,
If nobody shirked, and each one worked
To help his fellows along!

Cease wondering why you came,
Stop looking for faults and flaws;
Rise up to-day in your pride and say:
"I am part of the First Great Cause!
However full the world,
There is room for an earnest man.
It had need of me, or I would not be:
I am here to strengthen the plan."

*By permission of and special arrangement with Houghton Mifflin Company.

†By courtesy of W. B. Conkey Company, Hammond, Indiana.

JUNE

This selection is taken from *The Vision of Sir Launfal*, by James Russell Lowell, one of the foremost American poets. These verses contain the most beautiful description of June that has ever been written in any language.

AND what is so rare as a day in June?
Then, if ever, come perfect days;
Then Heaven tries earth if it be in tune,
And over it softly her warm ear lays;
Whether we look or whether we listen,
We hear life murmur or see it glisten;

The little bird sits at his door in the sun,
Atilt like a blossom among the leaves,
And lets his illumined being o'errun
With the deluge of summer it receives;
His mate feels the eggs beneath her wings,
And the heart in her dumb breast flutters and sings;
He sings to the wide world and she to her nest,—
In the nice ear of Nature which song is the best?

THE BRIDGE

This poem by Longfellow, which has for many years been a favorite recitation, is certainly one of the finest of his shorter pieces. The subject is picturesque and suggestive of thought. The poem is understood to have been inspired by just such a scene in Longfellow's native town of Portland, Maine.

I STOOD on the bridge at midnight,
As the clocks were striking the hour,
And the moon rose o'er the city,
Behind the dark church-tower.

I saw her bright reflection
In the waters under me,
Like a golden goblet falling
And sinking into the sea.

And far in the hazy distance
Of that lovely night in June,
The blaze of the flaming furnace
Gleamed redder than the moon.

Among the long, black rafters
The waving shadows lay,
And the current that came from the ocean
Seemed to lift and bear them away;

As, sweeping and eddying through them,
Rose the belated tide,
And, streaming into the moonlight,
The seaweed floated wide.

And, like those waters rushing
Among the wooden piers,
A flood of thoughts came o'er me
That filled my eyes with tears.

How often, oh, how often,
In the days that had gone by,
I had stood on that bridge at midnight,
And gazed on that wave and sky.

How often, oh, how often,
I had wished that the ebbing tide
Would bear me away on its bosom
O'er the ocean wild and wide!

For my heart was hot, and restless,
And my life was full of care,
And the burden laid upon me
Seemed greater than I could bear.

But now it has fallen from me,
It is buried in the sea;
And only the sorrow of others
Throws its shadow over me.

Yet whenever I cross the river,
On its bridge with wooden piers,
Like the odour of brine from the ocean
Comes the thought of other years.

And I think how many thousands
Of care-encumbered men,
Each bearing his burden of sorrow,
Have crossed the bridge since then.

I see the long procession
Still passing to and fro,
The young heart hot and restless,
And the old subdued and slow!

And for ever and for ever,
As long as the river flows,
As long as the heart has passions,
As long as life has woes;

The moon and its broken reflection
And its shadows shall appear,
As a symbol of love in heaven,
And its wavering image here.

AUTUMN

These lines are by the English poet Percy Bysshe Shelley, and illustrate a view of nature which, though it lacks the simplicity which we find in the nature poems of Robert Burns, gives us beauty of another kind, complex and more or less artificial, yet wonderfully rhythmical and melodious.

THE warm sun is failing, the bleak wind is wailing,
The bare boughs are sighing, the pale flowers are dying;

And the Year
On the earth, her deathbed, in a shroud of leaves dead

Is lying.
Come, Months, come away,
From November to May,
In your saddest array—
Follow the bier
Of the dead cold Year,
And like dim shadows watch by her sepulchre.

The chill rain is falling, the nipt worm is crawling,

The rivers are swelling, the thunder is knelling
For the Year;

The blithe swallows are flown, and the lizards each gone

To his dwelling.
Come, Months, come away,
Put on white, black, and gray;
Let your light sisters play;
Ye, follow the bier
Of the dead cold Year,
And make her grave green with tear on tear.

OH! BOYS, CARRY ME 'LONG

These old darky melodies are very dear to the hearts of most of us. The following was written by Stephen Collins Foster, who is also the author of The Old Kentucky Home.

OH! carry me 'long;
Der's no more trouble for me;
I'se gwine to roam in a happy home
Where all de niggas am free.
I've worked long in de fields;
I've handled many a hoe;
I'll turn my eye, before I die,
And see de sugar-cane grow.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

All ober de land,
I've wandered many a day;
To blow de horn, and mind de corn,
And keep de possum away.
No use for me now,
So, darkies, bury me low;
My horn is dry and I must lie,
Wha de possum nebber can go.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

Farewell to de boys,
Wid hearts so happy and light,
Dey sing a song, de whole day long,
And dance de juba at night.
Farewell to de fields
Ob cotton, 'bacco, and all;
I'se gwine to hoe, in a bressed row
Wha de corn grows mellow and tall.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

Farewell to de hills,
De meadows covered wid green,
Old brindle Boss, and de old gray hoss,
All beaten, broken and lean.
Farewell to de dog,
Dat always followed me round;
Old Sancho'll wail, and droop his tail,
When I am under de ground.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

THE SILENT VOICES

WHEN the dumb Hour, clothed in
black,
Brings the Dreams about my bed,
Call me not so often back,
Silent Voices of the dead,
Toward the lowland ways behind me,
And the sunlight that is gone!
Call me rather, silent Voices,
Forward to the starry track
Glimmering up the heights beyond me
On, and always on!

—ALFRED TENNYSON.

THE OLD ARM-CHAIR

Most of us have some inanimate thing in our possession around which cluster memories that make it unspeakably dear to us. Such a possession is typified in The Old Arm-chair, written by Eliza Cook, an English poet.

I LOVE it, I love it; and who shall dare
To chide me for loving that old arm-
chair?
I've treasured it long as a sainted prize;
I've bedew'd it with tears, and embalm'd it
with sighs.
'Tis bound by a thousand bands to my heart;
Not a tie will break, not a link will start.
Would ye learn the spell?—a mother sat
there;
And a sacred thing is that old arm-chair.

In childhood's hour I linger'd near
The hallow'd seat with listening ear;
And gentle words that a mother would give
To fit me to die, and teach me to live.
She told me shame would never betide,
With truth for my creed and God for my
guide;
She taught me to lisp my earliest prayer,
As I knelt beside the old arm-chair.

I sat and watch'd her many a day,
When her eye grew dim, and her locks were
gray;
And I almost worshipp'd her when she smiled,
And turn'd from her Bible, to bless her
child.
Years roll'd on: but the last one sped—
My idol was shatter'd; my earth-star fled;
I learnt how much the heart can bear,
When I saw her die in that old arm-chair.

'Tis past, 'tis past, but I gaze on it now
With quivering breath and throbbing brow;
'Twas there she nursed me; 'twas there she
died;
And Memory flows with lava tide.
Say it is folly, and deem me weak,
While the scalding drops start down my
cheek;
But I love it, I love it; and cannot tear
My soul from a mother's old arm-chair.

MY MENAGERIE*

This little poem by Mrs. Elder is full of the quaint fancies of childhood. Who among us has not lain on the soft, warm grass and watched the pictures in the sky form and melt away as the ever changing clouds drift across the heavens?

NO need to the circus to go have I,
For a whole menagerie lives in the sky!

And when in the tall, thick grass I lie,
I see the procession go passing by.

There are lions and bears and queer little
cats,
And moolies and mice and long-tailed rats,

And great big elephants trotting behind
Some very fat pigs who, I guess, have just
dined.

*Copyright, 1897, by The Youth's Companion.

And sometimes a clown slyly shows his
face,
As he struts along at a pompous pace.

And I laugh as I watch the caravan pass,
As I lie on my back on the soft, green grass.

It's lots nicer than sitting squeezed in a
row,
And the best of it is there's no pay, you
know.

All you have to do is to look at the sky,
And you'll see the procession go passing by.

THE BAREFOOT BOY

"The barefoot boy"—who does not love to see him at play
in his care-free days before the time comes when his feet
"lose the freedom of the sod"? John Greenleaf Whittier
shows him to us in all his winsomeness in this little poem.

BLESSINGS on thee, little man,
Barefoot boy, with cheek of tan!
With thy turned-up pantaloons,
And thy merry whistled tunes;
With thy red lip, redder still
Kissed by strawberries on the hill;
With the sunshine on thy face,
Through thy torn brim's jaunty grace;
From my heart I give thee joy,—
I was once a barefoot boy!
Prince thou art,—the grown-up man
Only is republican.
Let the million-dollared ride!
Barefoot, trudging at his side,
Thou hast more than he can buy
In the reach of ear and eye,—
Outward sunshine, inward joy;
Blessings on thee, barefoot boy!

Oh for boyhood's painless play,
Sleep that wakes in laughing day,
Health that mocks the doctor's rules,
Knowledge never learned of schools,
Of the wild bee's morning chase,
Of the wild-flower's time and place,
Flight of fowl and habitude
Of the tenants of the wood;
How the tortoise bears his shell,
How the woodchuck digs his cell,
And the ground-mole sinks his well;
How the robin feeds her young,
How the oriole's nest is hung;
Where the whitest lilies blow,
Where the freshest berries grow,
Where the ground-nut trails its vine,
Where the wood-grape's clusters shine;
Of the black wasp's cunning way,
Mason of his walls of clay,
And the architectural plans
Of gray hornet artisans!
For, eschewing books and tasks,
Nature answers all he asks;
Hand in hand with her he walks,
Face to face with her he talks,
Part and parcel of her joy,—
Blessings on the barefoot boy!

Oh for boyhood's time of June,
Crowding years in one brief moon,
When all things I heard or saw,

Me, their master, waited for.
I was rich in flowers and trees,
Humming-birds and honey-bees;
For my sport the squirrel played,
Plied the snouted mole his spade;
For my taste the blackberry cone
Purpled over hedge and stone;
Laughed the brook for my delight
Through the day and through the night,
Whispering at the garden wall,
Talked with me from fall to fall;
Mine the sand-rimmed pickerel pond,
Mine the walnut slopes beyond,
Mine, on bending orchard trees,
Apples of Hesperides!
Still as my horizon grew,
Larger grew my riches too;
All the world I saw or knew
Seemed a complex Chinese toy,
Fashioned for a barefoot boy!

Oh for festal dainties spread,
Like my bowl of milk and bread;
Pewter spoon and bowl of wood,
On the door-stone, gray and rude!
O'er me, like a regal tent,
Cloudy-ribbed, the sunset bent,
Purple-curtained, fringed with gold,
Looped in many a wind-swung fold;
While for music came the play
Of the pied frog's orchestra;
And, to light the noisy choir,
Lit the fly his lamp of fire.
I was monarch: pomp and joy
Waited on the barefoot boy!

Cheerily, then, my little man,
Live and laugh, as boyhood can!
Though the flinty slopes be hard,
Stubble-speared the new-mown sward,
Every morn shall lead thee through
Fresh baptisms of the dew;
Every evening from thy feet
Shall the cool wind kiss the heat:
All too soon these feet must hide
In the prison cells of pride,
Lose the freedom of the sod,
Like the colt's for work be shod,
Made to tread the mills of toil,
Up and down in ceaseless moil:
Happy if their track be found
Never on forbidden ground;
Happy if they sink not in
Quick and treacherous sands of sin.
Ah! that thou couldst know thy joy,
Ere it passes, barefoot boy!

A VISIT FROM ST. NICHOLAS

The annual visit of St. Nicholas (better known as Santa Claus) is the occasion of much excitement among our boys and girls. Clement C. Moore's poem is a great favorite with our children, for it gives such a vivid description of the event.

TWAS the night before Christmas, when
all through the house
Not a creature was stirring, not even a
mouse;
The stockings were hung by the chimney
with care,
In hopes that St. Nicholas soon would be
there;

The children were nestled all snug in their
beds,
While visions of sugar-plums danced in their
heads;
And Mamma in her 'kerchief, and I in my
cap,
Had just settled our brains for a long winter's
nap,
When out on the lawn there arose such a
clatter,
I sprang from my bed to see what was the
matter.
Away to the window I flew like a flash,
Tore open the shutters and threw up the
sash.
The moon, on the breast of the new-fallen
snow
Gave a lustre of midday to objects below;
When, what to my wondering eyes should
appear,
But a miniature sleigh and eight tiny rein-
deer,
With a little old driver, so lively and
quick,
I knew in a moment it must be St. Nick.
More rapid than eagles his coursers they
came,
And he whistled, and shouted, and called
them by name:
"Now, Dasher! now, Dancer! now, Prancer
and Vixen!
On, Comet! on, Cupid! on, Donder and
Blitzen!
To the top of the porch, to the top of the
wall!
Now dash away! dash away! dash away
all!"
As dry leaves that before the wild hurricane
fly,
When they meet with an obstacle, mount to
the sky,
So up to the house-top the coursers they
flew,
With the sleigh full of toys and St. Nicholas
too.
And then, in a twinkling I heard on the
roof
The prancing and pawing of each little
hoof.
As I drew in my head, and was turning
around,
Down the chimney St. Nicholas came with a
bound.
He was dressed all in fur from his head to
his foot,
And his clothes were all tarnished with ashes
and soot;
A bundle of toys he had flung on his back,
And he looked like a peddler just opening
his pack.
His eyes—how they twinkled! his dimples
how merry!
His cheeks were like roses, his nose like a
cherry!
His droll little mouth was drawn up like a
bow,
And the beard on his chin was as white as the
snow;
The stump of a pipe he held tight in his
teeth,
And the smoke, it encircled his head like a
wreath;

He had a broad face and a little round
belly
That shook when he laughed, like a bowlful
of jelly.
He was chubby and plump, a right jolly old
elf,
And I laughed when I saw him, in spite of
myself;
A wink of his eye, and a twist of his
head;
Soon gave me to know I had nothing to
dread;
He spoke not a word, but went straight to his
work,
And filled all the stockings; then turned with
a jerk,
And laying his finger aside of his nose,
And giving a nod, up the chimney he rose.
He sprang to his sleigh, to his team gave a
whistle,
And away they all flew like the down of a
thistle.
But I heard him exclaim, ere he drove out of
sight,
"Happy Christmas to all, and to all a good-
night!"

THE LOVE KNOT

The following poem, of which Nora Perry is the author, is full of a rollicking rhythm that has a certain charm. The simple manners of the maiden, and the artless way in which she won the heart of her lover, are graphically described. Only five of the six stanzas are given here.

TYING her bonnet under her chin,
She tied her raven ringlets in;
But not alone in its silken snare
Did she catch her lovely floating hair,
For, tying her bonnet under her chin,
She tied a young man's heart within.

They were strolling together up the hill,
Where the wind comes blowing merry and
chill;
And it blew the curls a frolicsome race,
All over the happy peach-colour'd face,
Till, scolding and laughing, she tied them
in,
Under her beautiful dimpled chin.

And it blew a colour, bright as the bloom
Of the pinkest fuchsia's tossing plume,
All over the cheeks of the prettiest girl
That ever imprison'd a romping curl,
Or, in tying her bonnet under her chin,
Tied a young man's heart within.

Steeper and steeper grew the hill;
Madder, merrier, chillier still
The western wind blew down, and play'd
The wildest tricks with the little maid,
As, tying her bonnet under her chin,
She tied a young man's heart within.

O western wind, do you think it was fair
To play such tricks with her floating hair?
To gladly, gleefully do your best
To blow her against the young man's breast,
Where he as gladly folded her in;
And kissed her mouth and dimpled chin?



THE BEES!

Moderately

Music by permission of MESSRS. SCHOTT & Co.

Words by ALFRED P. GRAVES.

1. Sum, sum, sum! bees a-bout us hum!

Fear us not, but fly to-gether Far a-way to wood and heath-er!

Sum, sum, sum! bees a-bout us hum!

2. Sum, sum, sum! bees to business come!
You this flow'et, you this flower,
Drain of dew, for pollen scour!
Sum, sum, sum! bees to business come!

4. Sum, sum, sum! bees about us hum!
When the Christmas-tree is lit up
Through its flowers you'll seem to flit up!
Sum, sum, sum! bees about us hum!

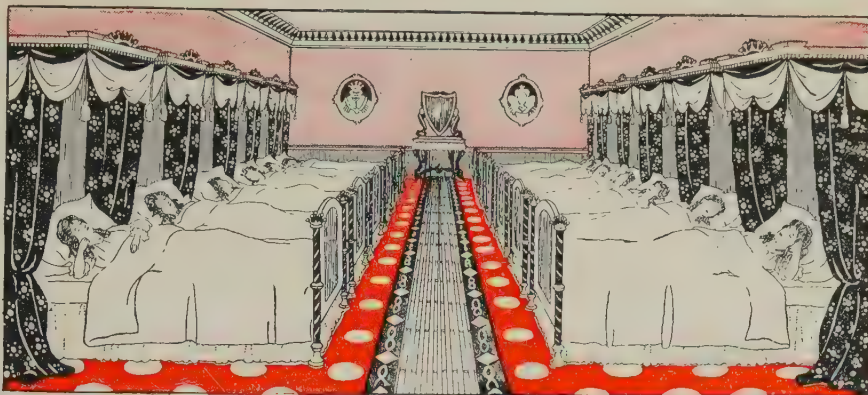
3. Sum, sum, sum! bees now cease your hum!
Hiveward with your spoil come sailing,
Sweets to store for our regaling!
Sum, sum, sum! bees now cease your hum!

5. Sum, sum, sum! bees about us hum!
Then the tapers bright will show you
All the honey-cakes we owe you!
Sum, sum, sum! while for joy you hum!

THEY DANCED TILL THEIR SHOES WORE OUT



When any of the princesses had a cup of wine set by her, the invisible soldier, who danced like the others, drank it all up. At this the youngest sister was most frightened, but the eldest sister silenced her.



TWELVE DANCING PRINCESSES

THERE was a king who had twelve beautiful daughters. They slept in twelve beds all in one room; and when they went to bed the doors were shut and locked up; but every morning their shoes were found to be quite worn through, as if they had been danced in all night; and yet nobody could find out how it happened.

Then the King made it known to all the land that if any man could discover the secret, and find out where it was that the princesses danced in the night, he should have the one he liked best for his wife, and should be king after his death; but whoever tried and did not succeed, after three days and nights, should be put to death.

A king's son soon came. He was well entertained, and in the evening was taken to the chamber next to the one where the princesses lay in their twelve beds. There he was to sit and watch where they went to dance; and, in order that nothing might pass without his hearing it, the door of his chamber was left open. But this king's son soon fell asleep; and when he awoke in the morning he found that the princesses had all been dancing, for the soles of their shoes were full of holes. The same thing happened the second and third nights, so the King ordered his head to be cut off. After him came several others; but they all had the same fate, and all lost

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their lives in the same manner.

Now it happened that an old soldier, who had been wounded in battle and could fight no longer, passed through the country where this king reigned. And as he was traveling through a wood, he met an old woman who asked him where he was going.

"I want to find out where it is that the princesses dance, and then in time I might be a king."

"Well," said the old dame, "that is no very hard task. Only take care not to drink any of the wine which one of the princesses will bring to you in the evening; and as soon as she leaves you pretend to be fast asleep." Then she gave him a cloak, and said: "As soon as you put that on you will become invisible, and you will then be able to follow the princesses wherever they go."

When the soldier heard all this good counsel, he went to the King, who ordered fine royal robes to be given him; and when the evening came he was led to the outer chamber. Just as he was going to lie down, the eldest of the princesses brought him a cup of wine; but the soldier threw it all away secretly. Then he lay down on his bed, and in a little while began to snore as if he were fast asleep. When the twelve princesses heard this they laughed heartily, and rose up

and opened their boxes, and took out all their fine clothes, and dressed themselves and skipped about as if they were eager to begin dancing. But the youngest of them said anxiously:

"I feel very uneasy; I am sure some mischance will befall us."

"You simpleton," said the eldest, "have you forgotten how many kings' sons have already watched us in vain? And as for this soldier, I took good care to give him his sleeping-draft."

When they were all ready, they went to look at the soldier; but he snored on, and did not stir hand or foot. So they thought they were quite safe; and the eldest went up to her own bed and clapped her hands, and the bed sunk into the floor and a trap-door flew open. The soldier saw them going down through the trap-door one after another. He jumped up, put on the cloak which the old woman had given him, and followed them; but in the middle of the stairs he trod on the gown of the youngest princess, and she cried out to her sisters:

"Someone took hold of my gown!"

"You silly creature!" said the eldest. "It is nothing but a nail in the wall."

Then down they all went, and at the bottom they found themselves in a most delightful grove of trees. The leaves were all of silver, and glittered and sparkled beautifully. The soldier wished to take away some token of the place, so he broke off a little branch.

Then they came to another grove of trees, where all the leaves were of gold; and afterward to a third, where the leaves were glittering diamonds. And the soldier broke a branch from each. Then they came to a great lake; and at the side there lay twelve little boats with twelve handsome princes in them who seemed to be waiting there for the princesses.

One of the princesses went into each boat, and the soldier stepped in with the youngest. As they were rowing over the lake, the prince who was in the boat with the youngest princess said:

"I do not know why it is, but though I am rowing with all my might we do not get on so fast as usual. The boat seems very heavy to-day."

"It must be the heat of the weather," said the young princess.

On the other side of the lake stood a fine castle, from which came the merry music of horns and trumpets. There

they all landed, and went into the castle, and each prince danced with his princess; and the soldier, who was all the time invisible, danced with them too; and when any of the princesses had a cup of wine set by her, he drank it all up, so that when she put the cup to her mouth it was empty. At this the youngest sister was terribly frightened, but the eldest always silenced her.

They danced on till three o'clock in the morning, and then all their shoes were worn out, so that they were obliged to leave off. The princes rowed them back again over the lake—but this time the soldier placed himself in the boat with the eldest princess—and on the opposite shore they took leave of each other, the princesses promising to come again the next night.

When they came to the stairs, the soldier ran on before the princesses, and lay down; and as the twelve sisters slowly came up, very much tired, they heard him snoring in his bed, so they said: "Now all is quite safe." Then they undressed themselves, put away their fine clothes, pulled off their shoes, and went to bed. In the morning the soldier said nothing about what had happened, but determined to see more of this strange adventure, and went again the second and third nights. However, on the third night the soldier carried away one of the golden cups as a token of where he had been.

As soon as the time came to declare the secret, he was taken before the King with the three branches and the golden cup; and the twelve princesses stood listening behind the door to hear what he would say. And when the King asked him: "Where do my twelve daughters dance at night?" he answered: "With twelve princes in a castle underground."

And then he told the King all that happened, and showed him the three branches and the golden cup which he had brought with him.

Then the King called for the princesses, and asked them whether what the soldier said was true; and when they saw that they were discovered they confessed it all. And the King asked the soldier which of them he would choose for his wife.

"I am not very young," he answered, "so I will have the eldest."

And they were married that very day, and the soldier became the King's heir.



THE GOBLINS IN THE GOLD-MINE

MANY years ago the land of Sweden was invaded by a vast horde of wild, fierce savages, and the King was afraid that they would capture his beautiful young daughter Princess Singorra. So, before setting out on his last battle with the invaders, he had a great cavern dug out in the middle of a lonely forest, and he put a store of food and candles in it, and placed Princess Singorra there for safety.

No one knew what had become of her except her sweetheart, the young Earl Svend, who led her to the hiding-place and closed up the secret entrance. He promised to return and let her out as soon as the battle was won; but, unhappily, the battle was lost. The savages killed the King and his soldiers, and laid waste the country and harried the people, and Earl Svend was wounded and carried by two faithful retainers to a town in Norway, and it was a long time before he got well again.

Meanwhile, Princess Singorra waited very sadly in the cavern for him to come and open the secret entrance. Then, finding that her store of food and candles was nearly gone, she resolved to try and dig her way out. But, instead of digging in the right direction, she made a hole leading to another cave under the earth.

Lighting the last of her candles, she entered the cave, and there she found a passage, and went along it; and at length she came to a vast underground space through which flowed a wide river. Right at the end was a great furnace, and around the furnace was a multitude of ugly little goblins, all busy mining and smelting gold.

"Kill her! She has found out our gold-mine! Kill her!" the goblins cried out angrily, when they saw her.

"No!" their king said. "She is too

useful to kill. You know we have just lost the frog we brought from the forest. We want another weather prophet to show us when the rain is going to fall and flood out our mine. She will do. Look!"

And he touched Singorra with a strange sort of wand, and turned her into a frog. The goblins then got a crystal vase and filled it with water, and made a tiny ladder leading from the bottom of the vase to the top, and put Singorra in it.

"Now we shall know when the rain is coming," said the King of the Goblins. "In fine weather Miss Frog will perch on the top of the ladder; in wet weather she will sit at the bottom in the water."

So Singorra became the goblins' weather prophet, and a very good weather prophet she was. It happened to be raining long and heavily outside, and without knowing why she did so, Singorra crept to the bottom of the vase and crouched as low down as possible. The goblins at first thought that she acted in this way because she felt wretched and miserable at having been changed into a frog.

But when the torrents of rain sank through the earth and swelled the waters of the underground river, so that it put out the furnace and flooded the mine, they were sorry that they had not gone by their weather prophet and made arrangements to leave the place.

Not an inch of dry ground was left, and they hastily climbed up the passage into the cavern where Singorra had been placed by her father. But, finding that this cavern was much too small to hold them all, they dug their way out into the forest one evening, and began to look about for some place large enough for them all to live in for a while.

Happily, Singorra was not left behind. The goblins had by this time learned to trust in their weather prophet. They

put the vase on a little trestle, and two of the goblins caught hold of the handles and began to carry her through the dark forest, when the brave and good Earl Svend came to the cavern with an army to release her.

cavern, and found that it was empty. Then, pleased by the fancy of the frog, he kissed it, and it at once changed into the beautiful Princess Singorra. After defeating the savages, Svend married Singorra, and became king of Sweden,



The goblins put the vase on a trestle and carried Singorra through the forest.

The goblins dropped the vase and ran away, and Singorra leaped out and jumped on Svend's shoulder.

"There is something very strange in this," said Svend. He took the frog gently in his hands and looked in the

and he found enough gold in the goblins' mine to rebuild all the towns and villages that the enemy had destroyed. So the adventure of Singorra brought some good, and the people became very happy.

THE GIANT WHO HAD NO HEART IN HIS BODY

BY KAY NEILSEN

ONCE on a time there was a King who had seven sons, and he loved them so much that he could never bear to be without them all at once, but one must always be with him. Now, when they were grown up, six were to set off to woo, but as for the youngest, his father kept him at home, and the others were to bring back a princess for him to the palace. So the King gave the six the finest clothes you ever set eyes on, so fine that the light gleamed from them a long way off, and each had his horse, which cost many, many hundred pounds, and so they set off. Now, when they had been to many palaces, and seen many princesses, at last they came to a King who had sixteen daughters; such lovely king's daughters they had never seen, and so they fell to wooing them, each one, and when they had got them for sweethearts, they set off home again, but they quite forgot that they were to bring back with them a sweetheart for Boots, their brother, who stayed at home, for they were over head and ears in love with their own sweethearts.

But when they had gone a good bit on their way, they passed close by a steep hill-side, like a wall, where the Giant's house was, and there the Giant came out, and set his eyes upon them, and turned them all into stone, princes and princesses and all. Now the King waited and waited for his six sons, but the more he waited, the longer they stayed away; so he fell into great trouble, and said he should never know what it was to be glad again.

"And if I had not you left," he said to Boots, "I would live no longer, so full of sorrow am I for the loss of your brothers."

"Well, but now I've been thinking to ask your leave to set out and find them again; that's what I'm thinking of," said Boots.

"Nay, nay!" said his father; "that leave you shall never get, for then you would stay away too."

But Boots had set his heart upon it; go he would; and he begged and prayed so long that the King was forced to let him go. Now, you must know the King

had no other horse to give Boots but an old broken-down jade, for his six other sons and their train had carried off all his horses; but Boots did not care a pin for that, he sprang up on his sorry old steed.

"Farewell, father," said he; "I'll come back, never fear, and like enough I shall bring my six brothers back with me;" and with that he rode off.

So, when he had ridden a while, he came to a Raven, which lay in the road and flapped its wings, and was not able to get out of the way, it was so starved.

"Oh, dear friend," said the Raven, "give me a little food, and I'll help you again at your utmost need."

"I haven't much food," said the Prince, "and I don't see how you'll ever be able to help me much; but still I can spare you a little. I see you want it."

So he gave the Raven some of the food he had brought with him.

Now when he had gone a bit further, he came to a brook, and in the brook lay a great Salmon, which had got upon a dry place and dashed itself about, and could not get into the water again.

"Oh, dear friend," said the Salmon to the Prince; "shove me out into the water again, and I'll help you again at your utmost need."

"Well!" said the Prince, "the help you'll give me will not be great, I dare say, but it's a pity you should lie there and choke;" and with that he shot the fish out into the stream again.

After that he went a long, long way, and there met him a Wolf, which was so famished that it lay and crawled along the road on its belly.

"Dear friend, do let me have your horse," said the Wolf; "I'm so hungry the wind whistles through my ribs; I've had nothing to eat these two years."

"No," said Boots, "this will never do; first I came to a raven, and I was forced to give him my food; next I came to a salmon, and him I had to help into the water again; and now you will have my horse. It can't be done, that it can't, for then I should have nothing to ride on."

"Nay, dear friend, but you can help

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me," said Graylegs the wolf; "you can ride upon my back, and I'll help you in your utmost need."

"Well! the help I shall get from you will not be great, I'll be bound," said the Prince; "but you may take my horse, since you are in such need."

So when the Wolf had eaten the horse, Boots took the bit and put it into the Wolf's jaw, and laid the saddle on his back; and now the Wolf was so strong, after what he had got inside, that he set off with the Prince like nothing. So fast he had never ridden before.

"When we have gone a bit farther," said Graylegs, "I'll show you the Giant's house."

So after a while they came to it.

"See, here is the Giant's house," said the Wolf; "and see, here are your six brothers, whom the Giant has turned into stone; and see, here are their six brides, and away yonder is the door, and in that door you must go."

"Nay, but I daren't go in," said the Prince; "he'll take my life."

"No! no!" said the Wolf; "when you get in you'll find a Princess, and she'll tell you what to do to make an end of the Giant. Only mind and do as she bids you." Well! Boots went in, but, truth to say, he was very much afraid. When he came in the Giant was away, but in one of the rooms sat the Princess, just as the Wolf had said, and so lovely a princess Boots had never yet set eyes on.

"Oh! heaven help you! whence have you come?" said the Princess, as she saw him; "it will surely be your death. No one can make an end of the Giant who lives here, for he has no heart in his body."

"Well! well!" said Boots; "but now that I am here, I may as well try what I can do with him; and I will see if I can't free my brothers, who are standing turned to stone out of doors; and you, too, I will try to save, that I will."

"Well, if you must, you must," said the Princess; "and so let us see if we can't hit on a plan. Just creep under the bed yonder, and mind and listen to what he and I talk about. But, pray, do lie as still as a mouse."

So he crept under the bed, and he had scarce got well underneath it, before the Giant came.

"Ha!" roared the Giant, "what a smell

of Christian blood there is in the house!"

"Yes, I know there is," said the Princess, "for there came a magpie flying with a man's bone, and let it fall down the chimney. I made all the haste I could to get it out, but all one can do, the smell doesn't go off so soon."

So the Giant said no more about it, and when night came, they went to bed. After they had lain a while, the Princess said: "There is one thing I'd be glad to ask you about, if I only dared."

"What thing is that?" asked the Giant.

"Only where it is you keep your heart, since you don't carry it about you," said the Princess.

"Ah! that's a thing you've no business to ask about; but if you must know, it lies under the door-sill," said the Giant.

"Ho! ho!" said Boots to himself under the bed, "then we'll soon see if we can't find it."

Next morning the Giant got up cruelly early, and strode off to the wood; but he was hardly out of the house before Boots and the Princess set to work to look under the door-sill for his heart; but the more they dug, and the more they hunted, the more they couldn't find it.

"He has baulked us this time," said the Princess, "but we'll try him once more."

So she picked all the prettiest flowers she could find, and strewed them over the door-sill, which they had laid in its right place again; and when the time came for the Giant to come home again, Boots crept under the bed. Just as he was well under, back came the Giant.

Snuff—snuff, went the Giant's nose. "My eyes and limbs, what a smell of Christian blood there is in here," said he.

"I know there is," said the Princess, "for there came a magpie flying with a man's bone in his bill, and let it fall down the chimney. I made as much haste as I could to get it out, but I dare say it's that you smell."

So the Giant held his peace, and said no more about it. A little while after, he asked who it was that had strewed flowers about the door-sill.

"Oh, I, of course," said the Princess.

"And, pray, what's the meaning of all this?" said the Giant.

"Ah!" said the Princess, "I'm so fond of you that I couldn't help strewing them,

when I knew that your heart lay under there."

"You don't say so," said the Giant; "but after all it doesn't lie there at all."

So when they went to bed again in the evening, the Princess asked the Giant again where his heart was, for she said she would so like to know.

"Well," said the Giant, "if you must know, it lies away yonder in the cupboard against the wall."

"So, so!" thought Boots and the Princess; "then we'll soon try to find it."

Next morning the Giant was away early, and strode off to the wood, and so soon as he was gone Boots and the Princess were in the cupboard hunting for his heart, but the more they sought for it, the less they found it.

"Well," said the Princess, "we'll just try him once more."

So she decked out the cupboard with flowers and garlands, and when the time came for the Giant to come home, Boots crept under the bed again.

Then back came the Giant.

Snuff—snuff! "My eyes and limbs, what a smell of Christian blood there is in here!"

"I know there is," said the Princess; "for a little while since there came a magpie flying with a man's bone in his bill, and let it fall down the chimney. I made all the haste I could to get it out of the house again; but after all my pains, I daresay it's that you smell."

When the Giant heard that, he said no more about it; but a little while after he saw how the cupboard was all decked about with flowers and garlands; so he asked who it was that had done that? Who could it be but the Princess?

"And, pray what's the meaning of all this tomfoolery?" asked the Giant.

"Oh, I'm so fond of you, I couldn't help doing it when I knew that your heart lay there," said the Princess.

"How can you be so silly as to believe any such thing?" said the Giant.

"Oh yes; how can I help believing it, when you say it?" said the Princess.

"You're a goose," said the Giant; "where my heart is, you will never come."

"Well," said the Princess; "but for all that, 'twould be such a pleasure to know where it really lies."

Then the poor Giant could hold out no longer, but was forced to say: "Far, far away in a lake lies an island; on

that island stands a church; in that church is a well; in that well swims a duck; in that duck there is an egg, and in that egg there lies my heart,—you darling!"

In the morning early, while it was still gray dawn, the Giant strode off to the wood.

"Yes! now I must set off too," said Boots; "if I only knew how to find the way." He took a long, long farewell of the Princess, and when he got out of the Giant's door, there stood the Wolf waiting for him. So Boots told him all that had happened inside the house, and said now he wished to ride to the well in the church, if he only knew the way. So the Wolf bade him jump on his back, he'd soon find the way; and away they went, till the wind whistled after them, over hedge and field, over hill and dale. After they had traveled many, many days, they came at last to the lake. Then the Prince did not know how to get over it, but the Wolf bade him only not be afraid, but stick on, and so he jumped into the lake with the Prince on his back, and swam over to the island. So they came to the church; but the church keys hung high, high up on the top of the tower, and at first the Prince did not know how to get them down.

"You must call on the Raven," said the Wolf.

So the Prince called on the Raven, and in a trice the Raven came, and flew up and fetched the keys, and so the Prince got into the church. But when he came to the well, there lay the duck, and swam about backward and forward, just as the Giant had said. So the Prince stood and coaxed it, till it came to him, and he grasped it in his hand; but just as he lifted it up from the water the duck dropped the egg into the well, and then Boots was beside himself to know how to get it out again.

"Well, now you must call on the Salmon to be sure," said the Wolf; and the king's son called on the Salmon, and the Salmon came and fetched up the egg from the bottom of the well.

Then the Wolf told him to squeeze the egg, and as soon as ever he squeezed it the Giant screamed out.

"Squeeze it again," said the Wolf; and when the Prince did so, the Giant screamed still more piteously, and begged and prayed so prettily to be spared, say-

ing he would do all that the Prince wished if he would only not squeeze his heart in two.

"Tell him, if he will restore to life again your six brothers and their brides, whom he has turned to stone, you will spare his life," said the Wolf. Yes, the Giant was ready to do that, and he turned the six brothers into king's sons again, and their brides into king's daughters.

"Now, squeeze the egg in two," said the Wolf. So Boots squeezed the egg to pieces, and the Giant burst at once.

Now, when he had made an end of the Giant, Boots rode back again on the

Wolf to the Giant's house, and there stood all his six brothers alive and merry, with their brides. Then Boots went into the hill-side after his bride, and so they all set off home again to their father's house. And you may fancy how glad the old King was when he saw all his seven sons come back, each with his bride—"But the loveliest bride of all is the bride of Boots, after all," said the King, "and he shall sit uppermost at the table, with her by his side."

So he sent out, and called a great wedding-feast, and the mirth was both loud and long, and if they have not done feasting, why, they are still at it.

THE GAME OF BILLIARDS

BY ALPHONSE DAUDET

AS they have been fighting two days, and have passed the night with their knapsacks on, beneath a flood of rain, the soldiers are completely exhausted. And yet for three mortal hours they have been left waiting, with grounded arms, in the puddles of the highroads and the mud of the saturated fields.

Benumbed by fatigue, by sleepless nights, and with their uniforms drenched with rain, they crowd together to warm and comfort one another. There are some who sleep standing, leaning against a neighbor's knapsack, and weariness and privations can be read distinctly upon those relaxed faces, overcome with sleep. Rain, mud, no fire, nothing to eat, a low, black sky, and the enemy in the air about. It is funereal.

What are they doing there? What is going on? The guns, with their muzzles pointing towards the wood, have the appearance of watching something. The *mitrailleurs* in ambush stare fixedly at the horizon. Everything seems ready for an attack. Why do they not attack? What are they waiting for?

They are awaiting orders, and headquarters sends none.

And yet headquarters is not far away. It is at yonder stately Louis-Treize chateau, whose red bricks, scoured by the rain, glisten among the trees half way up the hill—truly a princely dwelling quite worthy to bear the banner of a marshal of France. Behind a broad moat and a stone wall which separate them from the road, smooth green lawns, lined with

vases of flowers, extend to the porch. On the other side, the private side of the house, the hornbeam hedges show luminous gaps; the pond in which swans are swimming lies like a mirror, and beneath the pagoda-like roof of an enormous aviary, peacocks and golden pheasants flash their wings and display their plumage, uttering shrill cries amid the foliage. Although the owners have gone away, one does not feel the abandonment, the desolation of war. The *oriflamme* of the leader of the army has safeguarded even the tiniest flowers in the lawns, and it is an impressive thing to find so near the battle-field that opulent tranquillity that is born of perfect order, of the accurate alignment of the shrubbery, of the silent depths of the avenues.

The rain, which fills the roads yonder with such disgusting mud, and digs such deep ruts, here is nothing more than an elegant, aristocratic shower reviving the red of the bricks and the green of the lawns, polishing the leaves of the orange-trees and the white feathers of the swans. Everything glistens, everything is peaceful. Really, but for the flag floating on the roof, but for the two soldiers on sentry-go before the gate, one would never suspect that it is the headquarters of an army. The horses are resting in the stables. Here and there one sees a groom, or an orderly in undress uniform, loitering about the kitchen, or a gardener in red trousers placidly drawing his rake over the gravel in the great courtyards.

The dining-room, the windows of which look upon the porch, discloses a half-cleared table; uncorked bottles, soiled and empty glasses on the rumpled cloth; the end of a banquet, after the guests have gone. In the adjoining room one may hear loud voices, laughter, the clicking of balls and the clinking of glasses. The marshal is playing his game of billiards, and that is why the army is waiting for orders. When the marshal had begun his game, the heavens might fall, but nothing in the world could prevent him from finishing it.

Billiards! that is the weakness of that great warrior. He stands there, as grave as in battle, in full uniform, his breast covered with medals, with kindled eyes, flushed cheeks, excited by feasting, grog and the game. His aides-de-camp surround him, zealous and respectful, uttering admiring exclamations at each of his strokes. When the marshal makes a point, they all hasten to mark it; when the marshal is thirsty, they all rush to prepare his grog. There is a constant rustling of epaulettes and plumes, a jingling of medals; and to see all those sweet smiles, those artful courtier-like reverences, all those new uniforms and embroidery in that lofty apartment, with its oaken wainscoting, looking upon parks and courts of honor, recalls the autumn days at Compiègne, and affords the eyes a little rest from the stained cloaks that shiver yonder along the roads, forming such sombre groups in the rain.

The marshal's opponent is a young captain of the staff, belted and curled and light-gloved, who is in the first rank of billiard-players and capable of beating all the marshals on earth; but he has the tact to keep a respectful distance behind his chief, and devotes his energies to the task of not winning, and at the same time not losing too easily. He is what is called an officer with a future.

Attention, young man, let us be on our guard! The marshal has fifteen, and you ten. The point is to keep the game in that condition to the end; then you will have done more for your promotion than if you were outside with the others, beneath those torrents of water which drown the horizon, soiling your natty uniform, tarnishing the gold of your *aiguillettes*, awaiting orders which do not come.

It is really an interesting game. The

balls roll and clash and mingle their colors. The cushions send them merrily back; the cloth waxes hot. Suddenly the flash of a cannon-shot passes across the sky. A dull sound rattles the windows. Everybody starts, and each looks at the other anxiously. The marshal alone has neither seen nor heard anything; leaning over the table, he is busily engaged in planning a magnificent draw-shot; draw-shots are his strong point.

But there comes another flash, then another. The cannon-shots succeed each other in hot haste. The aides-de-camp run to the windows. Can it be that the Prussians are attacking?

"Very well, let them attack!" says the marshal, chalking his cue. "It's your turn, captain."

The staff quivers with admiration. Turenne asleep upon a gun-carriage was nothing compared to this marshal, who plays billiards so tranquilly at the moment of going into action. Meanwhile the uproar redoubles. With the roar of the cannon is mingled the tearing sound of the *mitrailleuses*, the rattle of musketry. A red steam, black at the edges, rises around the lawns. The whole park is on fire. The terrified peacocks and pheasants shriek in the aviary; the Arabian horses, smelling the powder, rear in the stables. Headquarters begins to be excited. Dispatch after dispatch. Couriers arrive at full speed. They ask for the marshal.

The marshal cannot be seen. Did I not tell you that nothing could prevent him from finishing his game?

"It is your turn, captain."

But the captain is distraught. That is what it is to be young. Behold he loses his head, forgets his tactics, and makes two runs in succession, which almost give him the game. Thereupon the marshal becomes furious. Surprise and indignation animate his manly face. Just at this moment a horse ridden at a hard gallop rushes into the courtyard. An aide-de-camp covered with mud forces his way past the sentries and ascends the steps at one bound. "Marshal, marshal!" You should see how he is greeted. Puffing with anger and red as a rooster, the marshal appears at the window, his billiard-cue in his hand:

"What's the matter? What's all this? Isn't there any sentry there?"

"But, marshal—"

"All right, in a moment; wait for my orders, in God's name!"

Wait for his orders! That is just what they are doing, the poor fellows. The wind drives the rain and the grape-shot full in their faces. Whole battalions are wiped out, while others stand useless, with their arms in readiness, utterly unable to understand their inaction. Nothing to do. They are awaiting orders. However, as one needs no orders to die, the men fall by hundreds behind the shrubs, in the moats, in front of the great silent chateau. Even after they have fallen, the grape tears them still, and from the open wounds the generous blood of France flows noiselessly. Above, in the billiard-room it is getting terribly

warm too; the marshal has recovered his lead, but the little captain is defending himself like a lion.

They hardly have time to mark the points. The roar of the battle draws nearer. The marshal has but one more to go. Already shells are falling in the park. Suddenly one bursts over the pond. The mirror is shattered; a swan in deadly alarm swims wildly about amid an eddy of bloody feathers. That is the last stroke.

Then, a profound silence. Only the rain falling on the hedges, a confused rumbling at the foot of the hill, and, along the muddy roads, a sound like the trampling of a hurrying flock. The army is in full retreat. The marshal has won his game.

A BATTLE WITH SNAKES

FROM WATERTON'S WANDERINGS IN SOUTH AMERICA

I **ADVANCED** up to the place slow and cautious. The snake was well concealed, but at last I made him out; it was a *coulacañara* not poisonous, but large enough to have crushed any of us to death. On measuring him afterwards, he was something more than fourteen feet long. This species of snake is very rare, and much thicker in proportion to its length than any other snake in the forest. A *coulacañara* of fourteen feet in length is as thick as a common *boa* of twenty-four feet. After skinning this snake, I could easily get my head into his mouth, as the singular formation of the jaws admits of wonderful extension.

On ascertaining the size of the serpent, I retired slowly the way I came, and promised four dollars to the negro who had shown it to me, and one dollar to the other who had joined us. Aware that the day was on the decline, and that the approach of night would be detrimental to the dissection, a thought struck me that I could take him alive. I imagined that if I could strike him with the lance behind the head, and pin him to the ground, I might succeed in capturing him. When I told this to the negroes, they begged and entreated me to let them go for a gun and bring more force, as they were sure that the snake would kill some of us. Taking, however, a cutlass from one of the negroes, and then ranging both of the sable slaves behind me, I told them

to follow me, and that I would cut them down if they offered to fly. When we got up to the place, the snake had not stirred, but I could see nothing of his head, and judged from the folds of his body that it must be at the furthest side of the den. A species of woodbine formed a complete mantle over the branches of the fallen tree, almost impervious to the rain or the rays of the sun. Probably he had resorted to this sequestered place for a length of time, and it bore the marks of an ancient settlement.

I now took my knife, determined to cut away the woodbine, and break the twigs in the gentlest manner possible till I could get a view of his head. One negro stood behind me with a cutlass. The cutlass which I had taken from the first negro, was on the ground close beside me, in case of need. After working in dead silence for a quarter of an hour, with one knee all the time on the ground, I had cleared away enough to see his head. It appeared coming out between the first and second coils of his body, and was flat on the ground. This was the very position I wished it to be in. I rose in silence and retreated very slowly, making a sign to the negroes to do the same. The dog was sitting at a distance in mute observance. I could now read in the faces of the negroes, that they considered this a very unpleasant affair, and they made another vain attempt to per-

suade me to let them go for a gun. I smiled in a good-natured manner, and made a feint to cut them down with the weapon I had in my hand. This was all the answer I made to their request, and they looked very uneasy.

It must be observed that we were about twenty yards from the snake's den. I now ranged the negroes behind me, and told him who stood next to me to lay hold of the lance the moment I struck the snake, and the other to attend my movements. It now only remained to take their cutlasses from them, for I was sure that if I did not disarm them, they would be tempted to strike the snake in time of danger, and thus forever spoil his skin. Taking their cutlasses from them, if I might judge from their physiognomy, they seemed to consider the most intolerable act of tyranny. Probably nothing kept them from bolting but the consolation that I was betwixt them and the snake. Indeed, my own heart, in spite of all I could do, beat quicker than usual. We went slowly on in silence, without moving our arms or heads, in order to prevent all alarm as much as possible, lest the snake should glide off, or attack us in self-defense. I carried the lance perpendicularly before me, with the point about a foot from the ground. The snake had not moved, and on getting up to him, I struck him with the lance on the near side, just behind the neck, and pinned him to the ground. The next moment the negro next to me seized the lance and held it firm in its place, while I dashed head foremost into the den to grapple with the snake, and to get hold of his tail before he could do any mischief.

On pinning him to the ground with the lance he gave a tremendously loud hiss, and the little dog ran away, howling as he went. We had a sharp fray in the den, the rotten sticks flying on all sides, and each party struggling for mastery. I called out to the second negro to throw himself upon me, as I found I was not heavy enough. He did so, and the additional weight was of great service. I had now got a firm hold of his tail, and after a violent struggle or two, finding himself overpowered, he gave in. This was the moment to secure him. So while the first negro continued to hold the lance firmly to the ground, and the other was helping me, I contrived to loosen my

braces, and with them tied the snake's mouth.

The snake now finding himself in an unpleasant predicament, tried to better himself, and set resolutely to work, but we overpowered him. We contrived to make him shift himself round the shaft of the lance, and then prepared to convey him out of the forest. I stood at his head, and held it firm under my arm, one negro supporting the belly and the other the tail. In this order we began to move slowly toward home, and reached it after resting ten times. The snake was too heavy for us to support, without stopping to recruit our strength. As we proceeded onward with him, he fought hard for freedom, but it was all in vain. We untied the mouth of the bag, kept him down by main force, and then cut his throat.

The week following a curious conflict took place near the spot where I had captured the large snake. In the morning I had been following a species of parouquet, and, the day being rainy, had taken an umbrella to keep the gun dry, and had left it under a tree. In the afternoon, I took Daddy Quashi (the negro) with me to look for it. While he was searching about, curiosity led me toward the place of the late scene of action. There was a path where timber had formerly been dragged along. Here I observed a young *coulacañara*, ten feet long, slowly moving onward. I saw that he was thick enough to break my arm, if he got twisted around it. There was not a moment to be lost. I laid hold of his tail with my left hand, one knee being on the ground, and, with the right hand I took off my hat, and held it as I would hold a shield for defense.

The snake instantly turned and came at me with his head about a yard from the ground, as if to ask me what business I had to take such liberties with his tail. I let him come, hissing and open-mouthed, within two feet of my face, and then, with all the force I was master of, drove my fist, shielded by my hat, full in his jaws. He was stunned and confounded by the blow, and ere he could recover himself, I seized his throat with both hands, in such a position that he could not bite me. Then I allowed him to coil himself around my body, and marched off with him as my lawful prize. He pressed me hard, but not alarmingly so.

STORY OF THE WILLOW-PATTERN PLATE

ON certain old china there is a painting in blue which is known as the willow pattern, and willow-pattern plate is perhaps the most famous china in the world. And it really comes from China, or so did the first plate, for the story is Chinese. This is the story.

A beautiful Chinese girl named Koong-Shee fell in love with her father's secretary Chang, who was a poor man. But the father of Koong-Shee wanted her to marry a rich man, and because she would not give up Chang

letter inside the shell, dropped it into the lake, and watched it sail across to where Koong-Shee sat watching. Koong-Shee read the letter and sent back her answer. She said she would go if her lover were brave enough to come and fetch her. Chang went boldly up to the little house and took her away. They had to cross the bridge to get out of the garden, and when they were halfway across Koong-

Shee's father saw them, and hurried after them. Koong-Shee went first with her distaff, Chang



Two pigeons flying high,
Chinese vessel sailing by,
Weeping willow hanging o'er,
Bridge with three men, if not four.

Chinese temple, here
it stands,
Seems to cover all the land,
Apple tree with apples on,
A pretty fence to end my song.

her father sent her away to a little house at the end of the garden. Outside Koong-Shee's window was a willow tree, and just beyond a fruit tree, and Koong-Shee sat all day watching it bloom. She was very lonely and unhappy, until one day Chang wrote and asked her to fly with him.

Chang dared not post the letter lest it should fall into the hands of Koong-Shee's father, but he found a coconut shell, fixed a sail to it, and putting his

followed carrying her jewel-box, and behind them ran the father with a whip. But the father did not catch them, and they escaped to a little house on the other side of the lake, where they lived happily. But the rich man who had wanted to marry Koong-Shee was so angry that one day he set fire to the pretty little house, and Koong-Shee and Chang were killed.

THE NEXT STORIES ARE ON PAGE 1575.

